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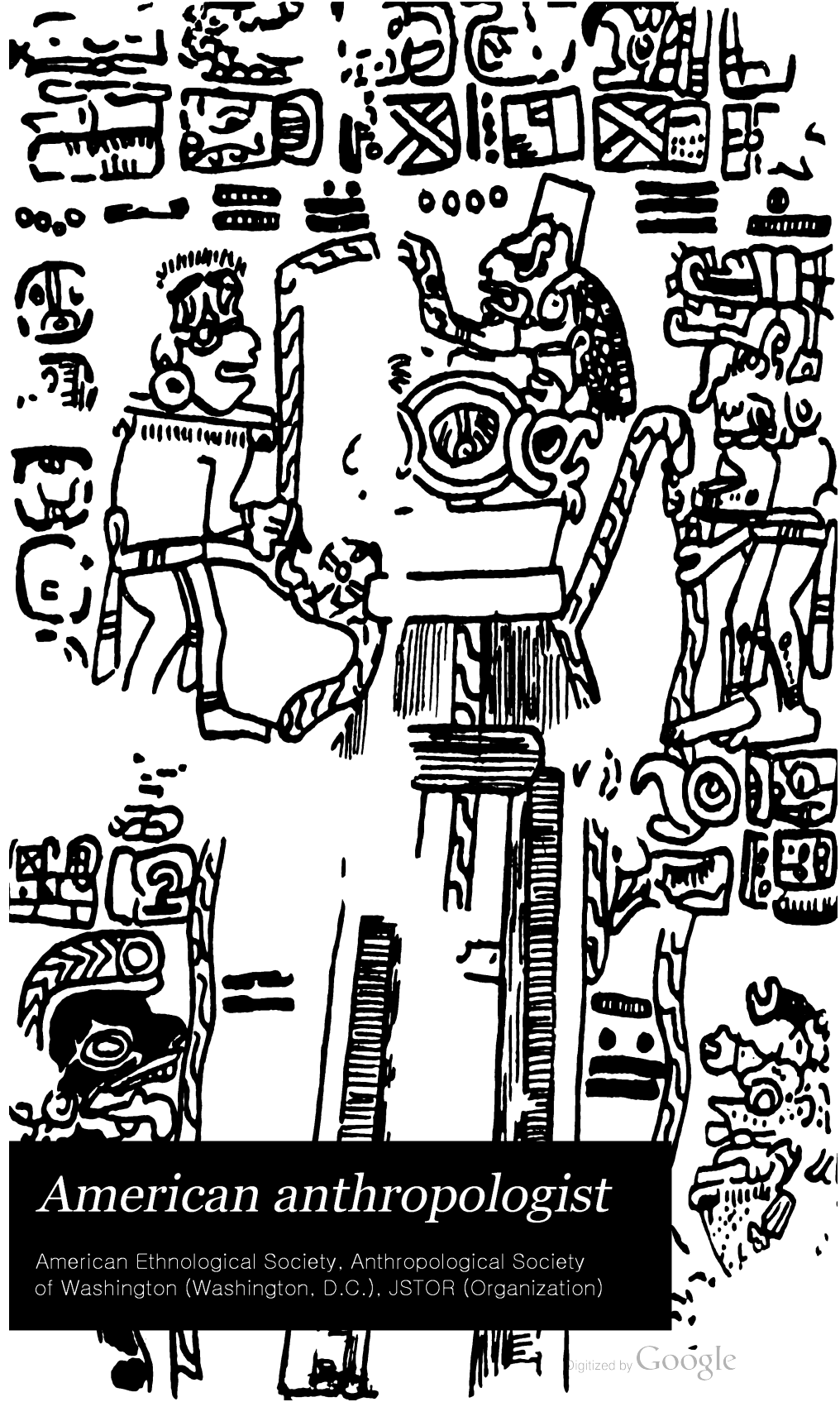
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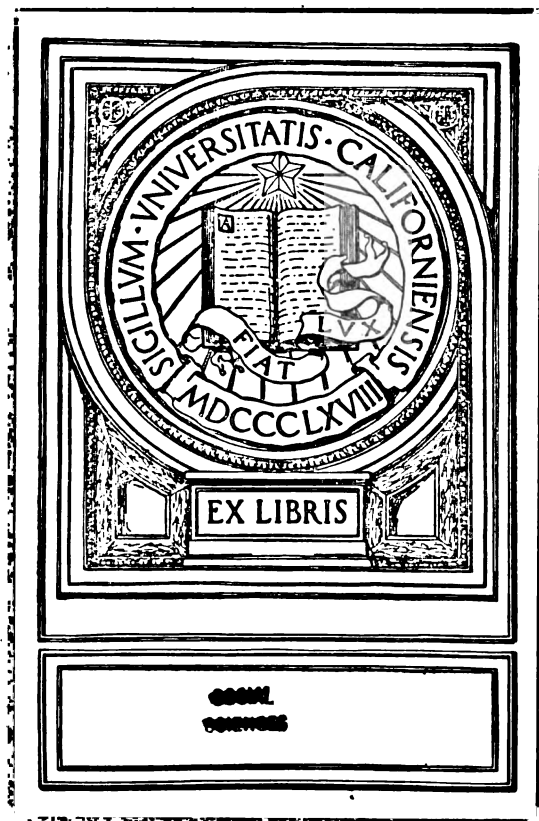


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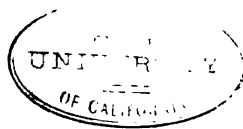
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THE AMERICAN ANTHROPOLOGIST

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STONE ART IN AMERICA

BY J. W. POWELL

DIRECTOR OF THE BUREAU OF AMERICAN ETHNOLOGY

In the December number of the *American Naturalist* Mr. Read, of the British Museum, has an article which exhibits a strange misunderstanding of the American problem of "paleolithic" man. It is a comment on a recent publication by Mr. J. D. McGuire, and is a naive misinterpretation of Mr. McGuire's position. A brief statement of the present condition of this question may save other well-meaning men from falling into like errors.

In the years 1867-1873, inclusive, a number of scientific men were engaged in exploring western Colorado, southern Wyoming, eastern Utah, and northern Arizona, in company with the writer. The country was then a wilderness, and the tribes inhabiting it were practically unknown before that time. They were many, yet each one embraced but a small number of persons, while they were scattered at wide intervals.

In a little valley north of the Uinta mountains a tribe of Shoshoni Indians were found still manufacturing stone arrow-heads, stone knives, and stone spears. Although a few of them were armed with guns purchased at far-distant trading stores, a greater number of the men and boys were armed with bows and arrows. In the valley which they occupied chalcedony is found in the form popularly called moss-agate. In 1869 the writer often saw these Indians manufacturing stone arrow-heads and stone knives. These were made from masses of moss-agate weathering out of the sandy shales of the district. The imple-

ments were made by breaking the masses with rude stone hammers, and selecting favorably shaped fragments to be further fashioned by the use of little stone hammers. A fragment held in one hand, protected by a piece of untanned elk skin, was wrought with a hammer held in the other hand. Having somewhat improved the original fragment in this manner, a workman would proceed to give his implement the final shape by using a deer-horn tool from 8 to 12 inches in length and worked down from its original size by grinding, so that its diameter was about five-eighths of an inch. Holding the specimen in one hand, with the implement in the other, he would work the little stone into the desired shape by sudden pressure on its edge with the horn tool and in this manner breaking off small flakes. The arrow-heads thus made were small, slender, and symmetric, while the stone knives were given keen but somewhat serrated edges. I visited this tribe of Indians many times and lived among them many months and found their camps strewn with the chips, among which were many discarded failures, all having the characteristics of those finds which in the eastern portion of the United States had been called "paleolithic." These Shoshoni were making "paleolithic" implements, in that all were chipped and none were polished.

At another time, on the eastern slope of the Wasatch mountains, I was with a tribe known as the Pahvant, and found them making stone arrow-heads and knives by the processes of breaking, battering, and grinding. They were making "neolithic" implements and no others, and this I observed many times through a succession of years.

At various times through a series of years I saw the Uintah Indians, a tribe living in the Uintah valley, on the eastern slope of the Wasatch mountains, make arrow-heads and stone knives, both by chipping and grinding.

At other times, again and again, for years, I saw the Pagu Indians manufacture stone implements in the valley of San Rafael, a tributary of the Colorado flowing from the eastern slope of the Wasatch plateau. These people made their implements by chipping. A mile above the mouth of the river, in a cottonwood grove, there is a village site which has been occupied intermittently for many years and probably for many centuries. In the Cretaceous bluffs near by great quantities of chert are found, and

not far away quantities of moss-agate. From these materials the Indians made their implements by chipping, and near the village site the flakes, rejects, and accidents may be found in great quantities, measured by wagon-loads.

In the valley of the Kanab, which is a tributary of the Colorado, are to be found the sites of ancient villages of the Uinkaret. These people made their stone implements of chert, moss-agate, and quartzite by chipping, and their pipes of steatite by grinding and boring—that is, they were polished.

The Tusayan Indians, on a tributary of the Little Colorado, have stone implements, pipes, and many other stone articles. Arrow-heads and knives are made chiefly by chipping, though a few are made by grinding; other objects in stone are often made by grinding and boring.

I have often seen all of these Indians and many others work in stone, for I have lived among them many years. By the criteria which are used to distinguish “paleolithic” man from “neolithic” man, some of the tribes were “paleolithic,” making their implements solely by chipping; others were “neolithic,” because they made their implements in part by chipping and in part by grinding. The criteria, therefore, do not apply to these Indians as a time distinction, nor do they apply to them as a culture distinction. All forms of “paleolithic” and “neolithic” implements were found to be made at the same time and by people in the same stage of culture, adapting their work to the materials found, while the chips and rejects, even to the so-called turtle-back forms, were produced in great abundance, though the turtle-back forms were rarer from the fact that they are chiefly derived from storm-fashioned boulders.

Such facts were observed not by myself alone, but by others, who were geologists and archeologists.

We now reach another phase of the question. In the eastern portion of the United States many so-called “paleolithic” finds have been made in a region of country extending from the Hudson to James river. These implements were freely gathered into our museums and distributed to the museums of Europe. One particular locality early attracted the attention of the writer—that on Piney branch, in the District of Columbia. Over this site I have wandered many scores of times. The implements found

here were by many believed to be "paleolithic" and to be a part of the gravel deposits found in the bluffs. In the examination which I made of them I found them strangely like the forms found near the Shoshoni village site, near the Pahvant village site, near the Uintah village site, near the Uinkaret village site, and near the Tusayan village sites, except that the turtle-back forms were much more abundant on Piney branch. Here we find the flakes or chips; here we see the turtle-back forms or rejects, and here we have the spoiled implements; and from this particular site many museums have been stocked with specimens illustrating the workmanship of "paleolithic" man. Years went by and the problem which I had contemplated so many times grew in interest, until at last the geologists and paleontologists decided that this particular gravel represents the Potomac formation belonging to the Cretaceous system. Now the problem assumed still greater importance, for if these vestiges of the work of man were actually deposited in the gravels at the time of their formation as shore accumulations, then the age of man must be carried back to Cretaceous time. Thereupon one of my associates, Mr. Holmes, assumed the task of solving the problem and was furnished with funds for the purpose, and he commenced at this particular site and trenched the Piney branch hill with care, remaining with his laboring force from day to day and from month to month. In doing this work it was clearly demonstrated that the gravels were not in the place where they were deposited by waves—that is, that they were gravels redistributed by overplacement, and that the manufacture of the stone implements could not be assigned to a period farther back than a few centuries. Thus "paleolithic" man was lost from the Cretaceous period. But Mr. Holmes' work did not stop here. He studied the village sites found in far-away towns by the river and found the stone implements which had been scattered there in modern times, and again found all the forms discovered at Piney branch, together with a much greater number of finished implements; and by a series of researches, the stages of which he has recorded in his deft manner, connected the two.

Mr. Holmes did not end his work at this stage; he went on from point to point down to the James and up to the Hudson, trenching the bluffs and examining the village sites, and everywhere demonstrating that the so-called "paleolithic" imple-

ments were of comparatively modern origin. Now in this region of country there are many gravels of different ages, extending from those of the Potomac formation below to the latest Pleistocene deposits above. In all of these gravels he found quarry sites with chips, rejects, and broken implements, and in the same manner he connected the artificial material with the village sites.

Thus throughout the eastern portion of the United States the old sites of "paleolithic" implements were examined and many new ones were discovered, and ever they told the same story. Then Mr. Holmes extended his observations far westward into many states and found kindred facts in many localities, and no facts inconsistent with those of eastern United States.

These observations did not rest on the shoulders of Mr. Holmes alone; many other American geologists visited him during the time he was occupied in examining the Piney branch site, and at other times in other places; and so far as I know all of the geologists who visited the sites at the time the excavations were made fully and cordially agree with Mr. Holmes.

One case now remains unexplained. At Newcomerstown, in Ohio, a rude stone implement was found in what was supposed to be a glacial gravel. The man who found it was doubtless honest in his belief that it was a genuine glacial find, though he did not claim to be a geologist. Mr. Holmes and others have visited the site since that time, but it has been changed to such an extent that it is impossible to determine whether the gravels were in place as primitively deposited, or whether they were in gravels modified by methods not understood at the time the find was made, though now well understood by geologists engaged in the study of glacial phenomena. Thus the evidence of "paleolithic" glacial man in this country has been narrowed to the single find at Newcomerstown, made by a man not trained as a geologist though doubtless intelligent and honest, and made many years ago under conditions which have now been changed so that it is impossible to discover the geologic facts. Such is the status of the "paleolithic" problem in America.

Other finds have been made on the Pacific coast, which, if genuine, carry man back in Pleistocene time, as an associate with extinct animals. These finds were made many years ago and have not been reëxamined by the new methods of research, but they do not bear on the problem of "paleolithic" man, for

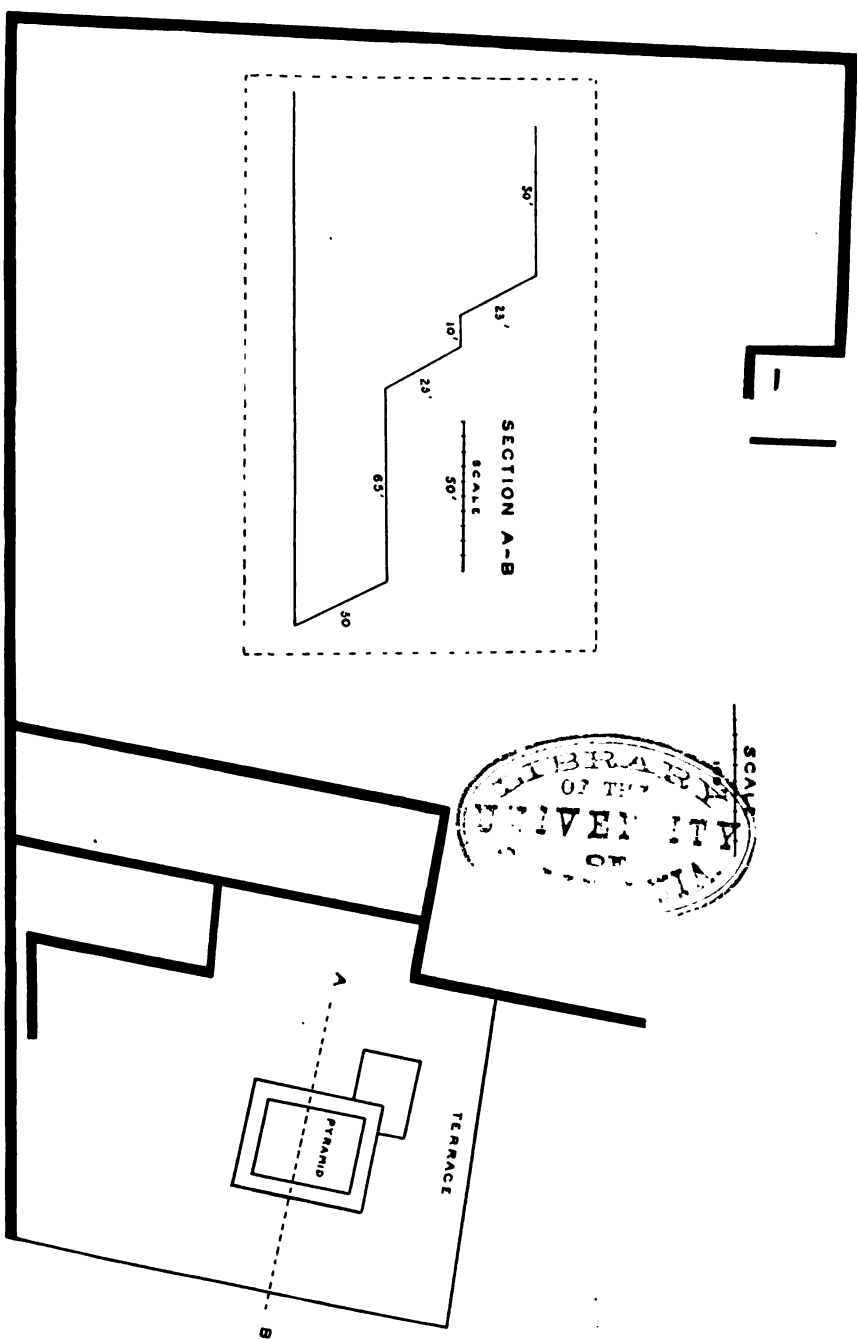
THE HUACOS OF CHIRA VALLEY, PERU

BY SAMUEL MATHEWSON SCOTT

The northern portion of Peru is a vast desert extending from the sea to the Andes and for about two hundred miles from Tumbez, the first landing place of Pizarro, on the north, to Sechura, on the south, a waste of sand and rock broken only at long intervals by narrow valleys that bring down the waters from the western slopes of the mountains.

Although this dreary expanse now maintains but a scattered population, there are still many evidences that not only the valleys, but also the desert itself, once supported a numberless people. The Chira valley, through which runs the principal river of the northern region, is filled with the ruins and the graves of this once flourishing civilization. The valley has an average width of three miles in its principal portion, which reaches from the town of Sullana to the Pacific, a distance of forty miles. The land is fertile under irrigation and supplies the wants of several towns and villages adjacent to it. It is at present divided into private haciendas or farms, or held by small communities; but no general system of cultivation is followed. While some of the haciendas are scientifically irrigated, much of the land receives only such attention as its natural position makes easy.

In the days before the Spanish conquest, however, it is evident that this valley was occupied by a people who, under the system of government which the Incas always imposed upon the various nations they conquered, developed all the resources of the territory to the fullest extent possible. Remains still exist of a great irrigation canal which ran, probably, from above Sullana to the sea. Tributary ditches laid with regularity and trained judgment may yet be traced. It is principally on the uncultivable land lying between the great ditch and the cliffs that form the northern wall of the valley that the ruins and graves are found, and it was through a series of excavations in this district during the last two years that I made the collection



of Peruvian antiquities now in the museum of the University of Pennsylvania.

The group of ruins which first attracted my attention is that situated some five miles to the westward of the town of Amotape, on the northern side of the valley, and which is known as Pare-dones, or the Great walls, a name which the natives have corrupted into Paderones. These ruins lie close to the cliffs of the desert, in a small bay-like ravine. They consist of a series of stone inclosures about a thousand feet long by six hundred feet wide, built in rough mud-mortared masonry, now so dilapidated that it is impossible to determine their original height. Into the center of this inclosure runs a low spur of the cliff, on which are a number of heavy adobe quadrangles, which apparently were the foundations of buildings or courts. On the western side of these walls the spur of the cliff was extended in the form of a square terrace about two hundred feet in each direction, from the center of which rises a truncated pyramid or pyramidal mound of two stories. The faces of the terrace and of the pyramid incline at a steep angle, which is reinforced by a wall or covering curiously constructed of conical adobes about the size and shape of a traditional sugar-loaf. In some portions of this facing, the cones, or *tulpas* as they are called by the natives, are set regularly one above another, the large end of the upper one resting upon the point of the lower one; but in some instances, without any apparent cause, the upper *tulpas* are inverted and their points lie between the points of the lower tier.

This arrangement may have served a decorative purpose, but the rains of centuries have so scored and destroyed the walls that no opinion can be formed of their original appearance. The face of the terrace is 30 feet high; that of each story of the pyramid 23 feet. The top of the pyramid is therefore between 75 and 80 feet above the plain. The base of the pyramid is about 90 by 75 feet; the top about 65 by 50 feet. One hundred yards to the westward of the terrace is another pyramid nearly the same size as the one just described, but differing from it in that it appears to have been built in the form of a square spiral of three stories. This second pyramid was not inside the great inclosure. An inclined road rising from the plain on the northern side of the inclosure and parallel with its wall gave access to the terrace. The arrangement of the quadrangular foundations at the upper

end of this road indicates an elaborately constructed gate or entrance.

Within the eastern portion of the inclosure, which is on a level with the plain, are numberless hillocks thickly covered by small white bivalve and spiral shells. The soil throughout this portion of the ruins is mixed with the finely powdered dust of ashes and is thickly strewn with heavy potsherds and pieces of more delicate pottery. These potsherds and ashes litter also the ground inside the large quadrangles.

As I had heard that pottery had often been exhumed in the neighborhood, I decided, after a careful examination of the ruins, that these sherds and fragments were the remains of pottery washed out by the rains, and indicated a fruitful field for excavation. I therefore set my diggers to work among the quadrangles. We soon penetrated the upper layer of ash dust and pieces of coarse jars and came upon a thick stratum of vegetable matter, which greatly resembled decaying thatch. Under this we found only the hard undisturbed soil of the spur. As repeated efforts in this direction were equally fruitless, I turned my attention to the hillocks. Here also I was disappointed. Nothing was encountered but loose earth mixed with ashes, shells, and fragments for several feet; then the hard undersoil. I learned from the natives, and confirmed their testimony by my own subsequent experience, that whatever may have been the object of these small shell-covered mounds, which are common to all the ruins of the valley and which often occur among the burial grounds, they were not used as graves, and may have been ovens for baking pottery.

Rather discouraged by my lack of success, I made inquiries among the people who live near the ruins and discovered that very little pottery had ever been found within the inclosure. One woman was able to tell me, however, that her husband and a friend had dug up several *huacos*, or pieces of pottery, in a ravine a mile or so lower down the valley, on the preceding Good Friday. The natives regard these relics of an ancient art with superstition. They believe that they are enchanted, and claim that they can be found only on Good Friday, when they come near to the surface. On that day the people go in large companies to the *huaco* fields, as they call the burial grounds, and spend the time in picnicing and digging. Whatever pottery they find

they use in their houses or sell. They can give no explanation of this idea of the charm of Good Friday, but they all accept it trustingly, and when I lighted upon a rich field shortly after my ill luck among the ruins they at once regarded me as a *brujo*, or wizard.

Following the woman's suggestion, I took a laborer with me and spent some days in exploring the ravines. We met with indifferent results until one day I came upon a quiet little valley nestled between the cliffs, in front of the village of Vichayal. We set to work at random on a gentle slope, and after digging through the tough mixture of gravel and clay that through the long years had been washed down from the hills we found a sand mixed with tiny white shells and charcoal. About a foot deep in this layer the boy uncovered the edge of what looked like a bundle of rags. He worked with his fingers for a moment and detached a piece of cloth. Jumping from the hole, he declined to dig any further.

"It is a Christian who is buried there," he said, reverently.

I seized the shovel and soon unearthed the bundle, which proved to be the bones of a baby enveloped in a coarse napkin of cotton.

"This is no Christian," I said to him; "Christian children are buried in coffins."

This argument proved conclusive; and as the soil below still showed signs of having been moved, I made him continue the work, for he had no scruples about disturbing antique bones. Some three feet lower down and about five feet below the natural level of the ground we disclosed two mummies lying side by side in the loose sand. The drainage of the slope was so rapid that no moisture had ever penetrated to the bodies, and the cloths in which they were wrapped were in perfect preservation. Beside each body was a bundle of weaving rods and a large gourd filled with *utiles*, or the long wooden sticks like knitting needles, used as shuttles. The absolute dryness of the soil had saved even these perishable things from decay. This was the first find in a field that proved very fruitful.

Almost invariably at about two feet below the surface we came upon a child's grave similar to the one first discovered. Evidently little care was taken in the burial of children under seven or eight years of age. The unembalmed body, dressed simply in a

sleeveless shirt, was tied up in a shroud and laid in the sand in some portion of the cemetery that had already been used for adults. It is rare to find pottery in these little graves. Sometimes a small stick is placed beside the body, and there may be a string of coral beads around the child's neck.

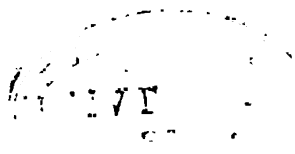
About four feet below the children's graves we meet with those of adults. These lie one below another, at irregular intervals, often to a depth of twenty feet. They differ greatly in their contents; less in their general character. The deepest graves are evidently of much greater antiquity than the upper ones. The objects they contain are fewer and of coarser quality and bear the characteristics of a less practiced art. While some bodies are buried directly in the sand, most are contained in hollow graves, into which the earth is prevented from falling by a slanting covering made of flat stones or large adobes. These graves are about eight feet long, four feet wide, and two feet deep. The dead are disposed in a manner different from that in other parts of Peru. Instead of being trussed up in sitting posture, the body lies on its back.

Some process of embalming was used, although the tissues are not preserved, as in the case of Egyptian mummies. The skin usually remains intact. The hair is perfect and is lighter in color and much finer in texture than that of the modern natives. The face also is well preserved, excepting that the eyes have fallen in and the cartilage of the nose is gone. These ancients were of about the same stature as their descendants, but they had smaller and more shapely hands and feet. The body was evidently dressed in the richest garments of the dead one. Beads of coral, fluorite, glass, and gold were twined about the neck; rings of gold or small strings of coral and copper beads adorned the fingers, and bracelets of beads encircled the arms. From the necklaces of the men hung a small pair of silver tweezers for plucking out the beard. In some instances bands in red and blue patterns were tattooed upon the wrists. The head, which always rests on the left shoulder, was covered with a kind of turban composed of strips of embroidery and fine cloth folded about the hair. The face, often tinted with a red pigment, was covered with raw cotton and tightly bound with cerements. A delicately woven fringed shawl, about a yard square and doubled diagonally, was wrapped thickly around the neck. About the

waist was usually wound a long sash, sometimes of tapestry. In this sash was occasionally tucked a small clay image; perhaps a charm or idol. It is difficult to discover the exact details of the rest of the clothing, as the moisture of decomposition and the preparations used in embalming have reduced to powder the fabrics immediately next the body. The dress of the women was apparently long and ample. The men wore a sleeveless shirt or tunic, supplemented by a cloak. On one of the ornamental water jars which I found is the figure of a man from which may be gained some idea of the usual costume.

Thus carefully attired, the body, covered with a winding sheet of cotton finely woven, was placed diagonally upon a series of large square shrouds. The ends of these shrouds at either side of the corpse were then folded across and around it, and the outer edge was carefully sewed up along its entire length with a large wooden needle, which was usually left sticking in the wrappings. The ends at the head and feet were then doubled over the body and secured to one another with a stout scarf, or, if the body was small, merely tied together in a knot. The fabric of these outer coverings differs greatly, probably with the condition in life occupied by the person. Sometimes there are but two coarse sheets; more frequently there are three or four, varying in fineness from the body outward; occasionally the outermost shroud is a double quilt thickly wadded with cotton.

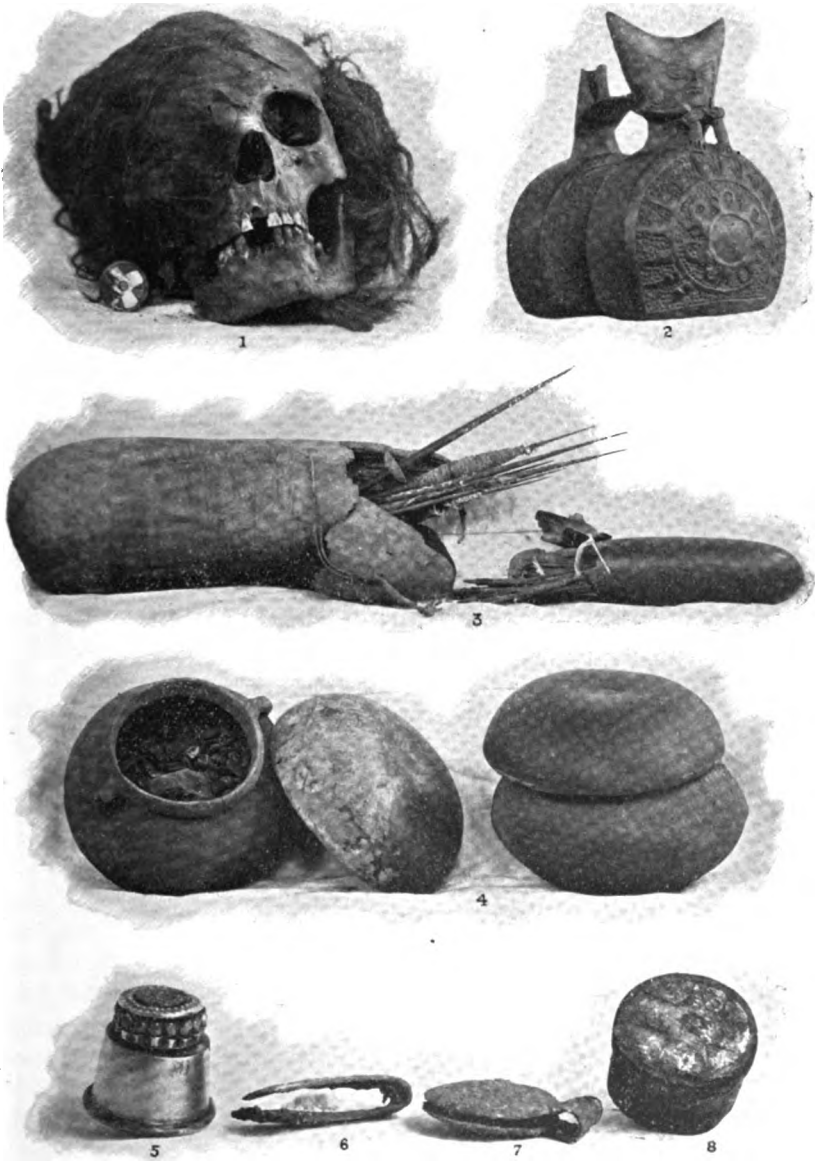
The grave was dug without reference to the points of the compass; but a regular system was observed in arranging the objects buried with the dead, although these objects themselves are of endless variety. At the feet of the corpse were placed several cooking pots covered with pieces of gourd or earthen plates and filled with food, meat, cooked corn, beans, frijoles; and small bundles containing whole ears of maize. There may be only one or two such pots, or there may be seven or eight. In one grave I found also a small gourd daintily wrapped in a napkin and holding a skillfully carved wooden spoon, the handle of which was fashioned into the figure of a man. At the side of the body, near the hands, were put the tools or implements used in life. In the case of men, there were walking-staffs of hardwood, with carved heads of men and animals, probably emblems of authority; small copper and stone tools—in one case the complete set of those of a silversmith, with cane blowpipes,



copper drills, and stone hammers or polishers; paint-pots made of gourds, with pigments and brushes; copper ladles used as melting pots; bows and arrows; once a barbed spear of algarroba wood very much decayed; agricultural implements, such as wooden shovels, rods, and pointed sticks; fish nets, water-bottles, and long netted traveling bags decorated in colors and filled with potatoes, ears of corn, and other provisions, and little packages of coca leaves.

In the graves of women were sets of weaving and spinning utensils similar in form, but greatly superior in finish, to those today used by the Indians. The weights for the spindles were of carved bone or shell. The various needles are prettily painted in rings, many of them still having colored threads wound upon them. The fineness of these threads and the skill and workmanship of the various fabrics show that these ancient women were more dextrous in the arts of weaving and spinning than are their descendants. The crotch for holding the *copo*, or roll of carded cotton, which today is only a natural fork cut from a tree, is in these graves an elaborately carved piece of algarroba wood. There were large gourds fashioned into work-boxes, bags full of balls of spun cotton; *yapata*, or magnesia, in large natural lumps or cut into cones like a corncob, for lubricating the thread in spinning. There were small shells containing red and blue paints, probably used in the toilet, and also larger shells wrapped in strips of rag. Some gourds containing skeins of brown and blue cotton point to the existence today of a very ancient custom. The Indian women who wear their hair in two braids always plait in similar skeins at the extremity of the braid, for the purpose, as they explain, of preventing the ends of the hair from splitting. The skeins in the gourds were doubtless used in the same way by the aborigines.

About the head of the mummy, whether male or female, were arranged the fantastic pieces of pottery in black and red clay which are known as *huracos*. These were probably filled with water or *chicha*—a beer made from corn, the beverage of ancient Peru. Upon these jars the old artists expended all their skill. The clay itself is very finely worked. The designs are infinite in variety and imitate every form of animal and vegetable life. There are jars in the shape of bananas, gourds, and melons; there are jars ornamented with human figures, climb-



Articles from Chira Valley, Peru.

- 1, Head of mummy with ear-ring in place; 2, Double huaco of black pottery with figure of man;
3, Gourds containing weaving implements; 4, Cooking-pots with gourd lids,
5, Labret; 6, 7, Tweezers; 8, Ear-ring.

ing monkeys, pelicans, parrots, fish, and serpents. There is, moreover, a distinct tendency toward the comic and grotesque—many animals have exaggerated teeth and birds have quaintly elongated bills. Very little of this class of pottery from the Chira is decorated with painting, although such decoration is common in the pottery from other parts of Peru. The pieces are also smaller than those from other districts. Besides the natural forms, there are many conventional shapes of much grace and beauty. The double whistling *huaco* is very common in this region. It consists of two vases joined by a tube; one vase forms the spout or mouth; the other is surmounted by some animal or bird, and is so devised as to emit the air through a whistle while water runs in through the spout. This whistle was probably a charm against evil spirits. One of the *huacos* which I unearthed, taken in connection with another of the collection from Chimbote, a field about four hundred miles to the south, offers a valuable suggestion as to the class of buildings which were erected upon the pyramids of the ruins. It represents a shed-like structure, roofed with thatch placed on a square base. The *huaco* from Chimbote is more significant, as it shows a building on top of a terraced pyramid, which is connected from story to story by flights of stairs. The decayed thatch which I found among the quadrangles of Paredones may have been the remains of such structures.

There are evidences that these burial places were of a consecrated character. Once, quite near the surface, I came upon a small bundle similar to a child's mummy. On opening it, however, I found inside the rough shroud, wrapped in a cotton cloth a yard square, one half of which was white, the other blue, about half the bones of a man, including the skull. They were covered with clay mud, and had evidently been gathered up, brought from a distance, and buried thus in holy ground. Thrown among them were a triple necklace of large coral beads and a piece of colored tapestry, on which was the conventionalized figure of a man. From what I learned from the contents of other graves, this piece of tapestry was a portion of the man's war or gala shirt. As the bones were dry when buried, no moisture had attacked the fabrics, and they were as good as on the day they were made. One side of the skull was crushed in, and in the center of the break was a small round hole, such as might have been made by



a spike of a club or by a bullet from a sling. The man may have been a warrior whose bones had bleached upon a distant battlefield. There was no pottery of any kind in this grave.

The similarity between the figure upon the tapestry and the human figures carved upon the wooden spoon and the walking-staffs, and also repeated upon another shirt which I found, together with the constant use of the monkey on staffs and pottery throughout this field, led me to the conclusion that these figures and animals may have served as tribal or family badges.

One of the mummies found on this slope was that of a chief or priest. The grave was hollow, but considering the importance of the occupant, it was singularly poor in contents. There was no fine pottery, and aside from a few cooking-pots and a water-jar, held only a long staff, with a human figure for a head. The wrappings of the body were very elaborate. The outside covering was a wadded quilt, embroidered all over with a figured design repeated in black, brown, and yellow; within were three shrouds beautifully woven of white cotton; each had an embroidered border in brown several inches wide of most complicated but regular geometric pattern, and in the center a large square of similar embroidery. The sumptuous attire was rich with tapestry fold upon fold, especially in the turban and in the sash. The left hand, which, as in the case of all these mummies, rested by the side, was swathed with two napkins, fringed and tasselled and embroidered in brown like the shrouds. In the palm of the hand was clasped a small black wooden vessel with a copper stopper, probably a lamp. About the neck were the strings of beads, with the silver tweezers. This was the only instance in which I found anything in the hands of the dead.

In many portions of Peru bodies have been unearthed with the mouth covered by a disk of gold. I have never seen indications of this custom on the mummies of the Chira, although I have found fragments of such disks among the ornaments hanging from the necklaces. In the graves of women, however, I discovered another custom. Through the lower lip of most of the female corpses protruded a jeweled conical-shape cylinder of silver or of gold, about an inch long and three-fourths to half an inch in diameter, slightly flanged at the larger end to prevent the piece from slipping. Most of these ornaments are badly corroded, but by good fortune in one of the little toilet gourds I found a

specimen in perfect condition. In the top is sunk a bloodstone, about which is set a circle of red coral balls, mounted separately. The body of the piece is of silver, hollow, but entirely closed. As these jewels do not occur in all the graves of females, it is possible that they were a sign of marriage. Many of the specimens have flowers of gold upon the crown instead of gems. All are wrought with great skill and show a high development of the silversmith's art. There are also other pieces of jeweler's work of great merit, such as wooden earrings inlaid with mother-of-pearl, and of gold wire twisted into spirals.

see fig 5

Another feature of these graves is worthy of attention. The soil with which they are filled shows signs of fire, and is thickly mixed with charcoal and pieces of charred leaves, sticks, and animal bones. These probably indicate that sacrifices formed part of the burial ceremony at the tomb, and that their remains were thus interred with the dead.

Unfortunately other duties prevented me from digging continuously upon the slope. The success of my excavations was bruited about and during my absence the natives, convinced that I was hunting for gold and buried treasure, kept up a series of diggings on their own account, which soon exhausted that portion of the field. Excavations in the level plain proved both difficult and unprofitable, as water had sunk into the graves, destroyed the contents, and damaged the pottery. I therefore continued my search in other directions. The best field proved to be the head of the ravine in which lie the ruins of Paredones. Here I found many graves, but their pottery was much coarser and cruder and seemed to belong to a remoter age than did that which I found upon the slope. The animal forms were less natural and the clay was by no means so fine. Although most of the graves had fallen in, it was clear that the same general system of burial had been followed as in the Vichayal field.

While I was carrying on this work I received an invitation from the owner of the hacienda of San Jacinto, near Sullana, to examine some *huaco* fields on his estate. As I had expected, the steward in charge of the place could tell me little about the fields beyond their locality. He merely knew that the people went digging occasionally and brought back *huacos* and "curiosities," and that some years before the mummy of a *cacique* or chief, fully dressed, had been unearthed. Two silver bowls had

been found with the body, but he could not say what had become of them.

Accompanied by a small force of peons, the steward and I left the fertile lands of the hacienda and came out upon a great barren plain about a mile in width and extending all along the foothills of the valley. Rising out of the midst of this flat stretch was a high hill irregularly surrounded by lower elevations. Inspection soon showed the eminence to be a flat-topped pyramid faced with conical adobes. The highest portion was perhaps 50 feet above the plain. The sides were about 200 feet long. Three of these sides were steeply inclined faces, running to the top without intervening stories. From the fourth or north-eastern side ran out a series of rectangular additions, wings, or L's of a lesser altitude. In spite of the long washing by the rain to which they had been exposed, these additions were still fairly level on top and the walls and divisions were clearly visible. It was on the outer slopes of the lowest of these wings, in the angle formed by its junction with the main structure, that the mummy of the *cacique* had been disinterred. It was evident that after this discovery a great deal of digging had been done. Bones and skulls were lying about, and in several places walls made of large brick-like adobes had been laid bare. Though smaller in extent, this edifice, known as Cerro de Mate, greatly resembled the one at Paredones.

After I had set my peons to work the steward and I mounted the principal height or pyramid, and from there he pointed out to me, at the western extremity of the plain about five miles away, a similar hill or mound, somewhat greater in size, which he assured me was of the same nature as the one we were on. Many smaller mounds were visible all over the barren country. Close at hand lay several low mounds, like the remains of out-buildings, from 5 to 20 feet in height. Along the southern edge of the plain we could see the line of the great irrigation canal, which must have been 50 feet wide by 20 feet deep. It is possible that the mounds and pyramids that dot the plain were built from the earth excavated from this big ditch.

For two days I dug around the foot of the ruin without success so far as *huacos* were concerned, although the whole surface of the ground is covered with bits of broken pottery. I therefore ran a shaft down the center of one of the smallest of the

neighboring mounds and uncovered foundation walls and many pieces of bone, shell, and pottery. I had determined to dig until I encountered the original surface of the plain. When I had sunk the shaft about twelve feet, and more than four feet below the present general level of the country, I came upon a layer of very fine ashes some four inches thick. Under this was the original undisturbed clay, but in spite of the ashes resting upon it, it showed no signs of fire or baking. The ashes must have been brought from elsewhere and spread here before the mound was raised. While I found no graves at this point, the bones and rags scattered about proved that many bodies had been unearthed on the lower skirts of this same mound at about four feet below the surface. Possibly the foundation walls I encountered were those of a small chapel, and in digging from the top I had only gone down through its floor, under which no graves were made. The dead were doubtless buried in the outside slopes.

Taking the advice of one of my peons who knew the place, I changed the field of work to a part of the plain a mile or two to the west. Here we met with better luck, and although much of the ground had been dug over by the natives in years past, we found several *huacos*, some beads, and two of the silver lip cylinders already described. Only a few bones and strips of cloth remained of the mummies. The earth here was clay impregnated with niter. It had been so soaked by the rains and baked by the sun that it was almost impossible to dig through it. This plain is so thickly covered with potsherds and shells that I have no hesitation in saying that the whole of it is one great burying ground.

On my way back to Amotape, while nearing a small town called Tamarindo, my attention was called to some wall-like lines on top of one of the cliffs. On examining them I found that they were parts of an immense edifice larger than many of our cathedrals. It crowned a cliff at least 150 feet high. The walls were adobe, with retaining foundations of stone on the more precipitous sides of the hill. There were the outlines of many rooms and corridors. In places *huacos* had evidently been exhumed. Shells and fragments abounded as in other places. On the plain just at the foot of this cliff was another structure identical almost with the one at which I had been working.

From the cliff above I could see the two great ruins on the plain of San Jacinto, the first one five miles distant, and Cerro de Mate five miles farther east. These ruins at Tamarindo are called Capullano. Undoubtedly there was some reason for placing these huge edifices at almost equal distances and within sight of one another. On the opposite side of the river, facing Tamarindo, near the town of La Huaca, is another set of similar ruins.

It is almost vain to speculate upon the age of these various works. We know that this portion of the country was well populated at the time of Pizarro's conquest, and that the Spaniards were astonished at the advanced condition of the people; beyond this we have few data for conjecture. Such evidence as there is seems to give the works a sacred character. Religion must have played a great part in the lives of a people who made so much of death. Had they been fortresses or palaces they would hardly have been made the centers of national burial fields. The enormous quantities of ashes mingled with the earth about them may indicate the perpetual fires of sacrifice. Many of the buildings may have been in ruin long before the Spaniards came, for it seems incredible that the rains and winds and neglect of three hundred short years could have reduced them to the condition in which we now find them.

The valley, even under the most elaborate system of irrigation, could have maintained only a few thousand people, while the graves must be numbered by millions. The development in the arts of weaving, silver-working and pottery revealed by a comparison of the contents of the lower graves with those of the upper tiers must have resulted from the labor of many generations among a people so unprogressive as we know such races to have been. That graves lie thus one above another is not in itself a proof that the lowest graves greatly antedate the upper ones. They are lower because floods or rains raised the level of the valley after they were made, and the stratum newly formed above them became available for burial purposes. Such changes may have been the work of ages, but the torrential rains which sometimes break over the desert might accomplish the same result in a single season.

Physically, and no doubt intellectually, these aborigines were superior to their modern successors. They must have had an extensive commerce, for the gems found in the graves could only have come from the far north and east. But whence this

people came, how long they occupied this valley of the desert, and whether their civilization was in its zenith or in its decline at the time of Pizarro's arrival among them are mysteries which, through the absence of written records, we shall probably never be able to solve. We know that they were tributary to the great kingdom of the Incas, but otherwise we know nothing of their history.

A study of the practices of the modern natives in the light afforded by the collection shows a remarkable survival of ancient industries and methods. At Catacaos, near Piura (the old San Miguel de Piura, the first permanent city founded by the Christians in Peru), there exists today a very curious community of Indians, whose manners and customs differ greatly from those of their Cholo neighbors. They have but little intercourse socially with the people about them, marry among themselves, adhere to an obsolete form of attire, and seem to be generally in a condition of arrested development. The inhabitants may be regarded as an unchanged remnant of the past. Their principal industries are straw-braiding (they make most of the so-called Panama hats used in the world) and the manufacture of pottery. The former industry is probably a modern adaptation of an ancient art. The potters follow without change the methods of their prehistoric ancestors, but their products fall far behind in finish and artistic taste. In a hole in the ground a moistened mixture of clay and sand is set to "rot" for several days. When in proper condition this clay is formed by hand, with wooden tools, over rounded stones, into the shapes of the ordinary coarse cooking pots and other vessels for common use. The neck or mouth is made in a separate piece and joined to the body by a separate operation. When finished, the pots are dried in the sun and then piled in a rude oven, with layers of dry grass or reeds, and baked. This method of firing is very imperfect, as at least ten per cent. of the pieces are lost—a fact which accounts for the tons of fragments which lie around the ancient ovens. The fancy shapes, such as human heads, figures, fruit and vegetable forms, which are used as water jars, are made in sections, in molds of baked clay exactly like the molds found in the old graves. The art is handed down from father to son.

From the weaving tools in the collection Mr. Frank Hamilton Cushing, of Washington, has been able to reconstruct the loom

of the ancients, on which it is possible to reproduce the most intricate patterns and tapestries of the graves—a feat hitherto declared to be impossible, for as no loom frame has ever been found in Peruvian remains it was supposed that the work was accomplished by unknown methods. I was surprised to discover that Mr. Cushing's loom is identically the same as the one now in use by all the Indian women in the Chira region, although, as in the case of the pottery art, the moderns have fallen off greatly in skill. The peculiarity of this loom is that the weaver, by the use of a strap passed around the body, becomes herself the frame.

I found another case of survival in the silversmith's art. Although the present practices have been modified by modern tools and other foreign influences, the force of tradition appears in a persistent fondness for wire filagree. In the collection there is a pair of gold earrings of wire twisted into spiral cones. At Amotape, on the Chira river, I met a very intelligent half-breed named Cornejo who is an exceedingly skillful goldsmith. The art has been in his family for generations.

In one of the graves I unearthed a bundle of agricultural implements, consisting of an algarroba spade with a straight handle and blade, a short wooden dibble, and a plain stick four or five feet in length. These have their counterparts in modern times. The natives still use a straight-handled spade, but the blade is now of steel, and the dibble for planting corn and cotton. The rod in the bundle was doubtless employed as a measure of distance between the corn or cotton rows.

The superstitions and ceremonials of ante-Spanish times appear today in a thousand forms under the thin gloss of Christianity, and even in connection with many features of the modern ritual.

CASTE IN INDIA

BY J. H. PORTER

When caste in an inchoate form issued from overcrowding within limited areas, spontaneous social segregation, and race and religious antagonisms, a priesthood, recently become dominant, took advantage of it at once, systematized its restrictions, and declared its laws to be revelations from heaven. There was nothing national or ethnic in this action. It was the natural and obvious policy of a usurping order, seeking to strengthen a position it was unable to maintain by force. Persistent efforts to the same end were made in Persia and Egypt, but unsuccessfully.

Vedantism did not lend itself to ecclesiastical encroachments. Brahmanism, on the contrary, rested upon the supremacy of a priestly class, as did that Hinduism by which it was followed. To the first caste was unknown, while both the latter supported it with all the power they could command.

Practically Buddhism was a revolt against caste tyranny. In this respect it finally failed. While the church in India maintained itself no alteration of abstract doctrine could affect formal observances. Caste outlived the jar and conflict of nations and creeds, the wreck of theologies, and the transformation of gods. It still lives, while the principles of Sākya Muni are taught at Banāras and when the Neo-Brahmanism of Sankarāchārya, in so far as it can be said to possess any religious vitality, has derived it from Buddhism.

Caste was invincible except to an assault which would overthrow the order whose interests were involved in its existence. The results of causes operating toward that end have been here traced in general outlines.

Freed from myths and traditions, conflicting views, the intricacies of state papers, and those technicalities which obscure Sanskrit codes, caste organization is seen to put an end to all we consider essential to liberty and happiness, prosperity or progress. It is the most memorable, comprehensive, and suc-

cessful attempt ever made by an order to oppress humanity in its own interests. Its enactments broke up the race into fragments never to be reunited, separating Aryans from other peoples by impassable barriers, permanently fixing their occupations, interests, associations, and aspirations. As men were born, so must they remain. Their course of life was prescribed, their places after death predetermined. Of the four castes, three were formed from the conquering race, *Brāhmanas*, a priesthood; then *Kshatriyas*, warriors, and *Vaisyas*, herdsmen in the first place, afterward farmers. These last two existed chiefly for the benefit of the first. As for the fourth, *Sūdras*, they were those "slave bands of black descent" (*varna* meant both caste and color), the remnant of a native population (*Dāsas*), whom our worthy ancestors had not slaughtered when they took possession of their property. Those Dravidian and Kolarian peoples who remained unconquered and still occupied three-fourths of India when these revelations concerning them came down from heaven, were dogs and devils, given up to eternal reprobation.

The sacred text treats of caste distinctions as follows: "In order to protect this universe He, the most resplendent one, assigned (to men) separate duties and occupations. * * * To *Brāhmanas* he assigned teaching and studying" [the *Veda*, *śruti*, or revelation], "sacrificing for their own benefit and that of others; giving and receiving alms."* These avocations and offices were limited to the "twice born"—Aryans who came into the world naturally, as men, and had a second birth through initiation into the number of those that might be saved. *Sūdras* and the rest—aborigines, out-castes, Pariahs—were not men, but as beasts that perish, to be taught nothing and given nothing; likewise nothing could be accepted from them. On the other hand, "the very birth of a *Brāhmana* is an eternal incarnation of the sacred law." By divine right he is a member of all courts, an assessor or judge in every case. It is his province to settle disputed points, to impose penances, to perform rites essential to salvation. He sanctified the companies into which he came. To resist his will was mortal sin; to defame him, sacrilege; to strike him, death. "Let the first part of a *Brāhmana*'s name denote something auspicious * * * the second part of a *Brāh-*

* C. i, v. 87, 91, 95.

mana's name shall be a word implying happiness." But with a Sûdra, "the first part must express something contemptible," and the second part "be an expression denoting service."* A member of the priestly caste could not be executed. "All other castes shall suffer capital punishment," but "no greater sin is known on earth than killing a Brâhmana. A king must therefore not even conceive in his mind the thought of killing a Brâhmana. * * * Let him never slay a Brâhmana, though he has committed all possible crimes."† There is no need for him to be "uselessly active with his hands or feet." Gifts to a Brâhmana are meritorious, and if he wants anything let him take it. "A Brâhmana coming into existence is born as the highest on earth, the lord of all created beings. * * * Whatever exists in the world is the property of the Brâhmana. * * * The Brâhmana eats but his own food, wears but his own apparel, bestows but his own in alms; other mortals exist through the benevolence of the Brâhmana."‡ He might not "give the leavings of his meal to a hungry Sûdra," and if even a "twice-born" man listen to his instructions without permission, "he shall sink into hell."

"One occupation only the Lord prescribed for the Sûdra, to serve meekly."§ "A wealthy Brâhmana shall compassionately support both a Kshatriya and a Vaisya if they are distressed," but not "make initiated men of the twice-born castes against their will do the work of slaves. A Sûdra, whether bought or unbought, he may compel to do servile work, for he was created by the Self-existent (Svaya-mbhû) to be the slave of a Brâhmana. * * * Though emancipated by his master, he is not released from servitude; since that is innate in him, who can set him free from it."||

This and much more to the same effect by those who traded in all human needs and necessities from the hour of birth until a man's ashes mingled with those of his funeral pile. No such system can come into existence immediately, but the priesthood taught that it descended from on high to the prophets in a com-

* C. ii, v. 31, 32.

† C. viii, 379, 380, 381.

‡ C. i, v. 99, 100, 101.

§ C. i, v. 87.

|| C. viii, v. 413, 414.

pleted form. Brahmanism, however, began when a section of the pastoral Aryans, rent from their kinsmen in the region of the modern Kanhates, probably by some ritualistic schism, burst into the Punjab. India has no secular history of ancient times, but her religious records in some measure make good this deficiency. From them we learn that in those days the head of each family was father, chief, and priest; that in every tribe its leader stood in like relations toward the whole aggregate. On the occurrence of public sacrifices whose efficacy depended upon a strict adherence to traditional rites it was found that this aggregate was very frequently at fault. They understood fighting better than sacred services, and as it was of the last importance that these should be performed correctly, some householder who knew the rubric was selected as a celebrant. Such men grew into permanent sacrificers and priests; their functions became hereditary; they founded families which were the repositories of a knowledge that the laity had forgotten. Such groups developed into classes, and finally consolidated as a caste. The Brāhmanas' position depended upon their attainments. Schools were founded to preserve and propagate sacred learning, and in time they inevitably differed, so that their names, taken from those of great teachers (Apastāmba, Gautama, Baudhyāna, and so on), really represent separate codes whose revelations (*Sruti*) and traditions (*Smṛiti*) are not the same.

With a caste organization the priesthood found means to increase their power by recasting scholastic systems, changing and adding to the injunctions they contained, and adapting them more perfectly to their own advantage. Such Dharma-Sūtras (laws of duty) were declared to be obligatory upon all "twice-born" men and issued as direct utterances of the Almighty—"He who is indiscernible and eternal." Enough of those works survive to show the process described, but that great canonical Manu-Smṛiti quoted, and which is known throughout the world as "The Laws of Manu," was taken from a Mānava Dharma-Sūtra that has perished.

In early days, however, if Aryas had souls to be saved, they had also battles to fight. Priests claimed that victory was granted through their intercession; soldiers said it was won by their swords. The parties clashed; both claimed the spoils, and they fought for precedence in long, fierce wars whose history is lost

and of which all we know is that the Brâhmanas won. It was to this success that the caste system owes its existence, while those claims, restrictions, and penalties it contained necessarily led to the formation of sub-castes, sections, and out-castes. A sage saturated with sanctity could not do as a warrior might, nor the latter do what was proper for an agriculturist. Many things that *must* be done and which men *will* do under all circumstances were unlawful for any Aryan.

Caste, however, never became effective in the ideal form in which it was promulgated, nor was it so widely diffused as people generally suppose. Nevertheless this incubus crushed progress and public spirit out of unnumbered millions and stood undestroyed amidst shocks such as no similar system ever sustained. Wars of conquest overwhelmed it in infancy, maturity, and old age, and its form arose again. Scythian and Greek, Arab, Persian, Pathan, and Mongol, Sikh and Englishman, destroyed and changed, while this endured. The religion of which it was the keystone passed from nature worship through Vedantic doctrinalism into the base idolatries of Hinduism, and caste remained. Buddhism, which is before all else a protestation against its tyranny, converted one-third of the earth's inhabitants and became extinct in India, leaving caste unchanged. Reformers and heresiarchs, with innumerable followings, renounced its authority, but proselytes came in upon all sides to take their places. Christianity and Mohammedanism assailed caste unsuccessfully. Human nature revolted against it in vain.

Now its last barriers are breaking down. During the more tranquil ages succeeding Aryan invasion the warrior class lost its former individuality; the old Vasaiya assumed the character of a modern husbandman. Theoretically these castes persisted, but practically they faded slowly and insensibly away. Members of powerful Kshatriya families had at all times made their way into the Brahmanical order, and the descendants of rich farmers were adopted into the military class, but such permutations availed nothing against that suppressive power by which they were opposed; neither did they touch the distinction existing between the highest and lowest. That last impassable gulf is being bridged, but not by organized effort of any kind.

People who in anywise appreciate the importance of great events do not attempt to foretell their consequences; that depart-

ment of prophecy is appropriated by men of a different stamp. If, however, we can neither foresee such results in their fullness nor estimate the respective values of those factors by which they were brought about, nothing prevents us from recognizing existing facts, and perhaps the most important of these in India is what Sir Alfred Lyell calls "the gradual Brahmanizing of the aboriginal, non-Aryan, or casteless tribes." It may seem at first sight that the conversion of outsiders and opponents into adherents tends to strengthen this institution; that to accelerate and increase transitions heretofore inconspicuous would build up the system instead of breaking it down. No such metamorphosis, however, as that of Sûdra masses into "twice-born" men can take place otherwise than destructively. This is obvious, and it accounts for an anomalous feature of those periods when it was impossible, namely, that caste, before senile atrophy enfeebled it, remained apparently unaffected by national convulsions of all kinds. Those great resolvents which bring about reconstruction by affording an opportunity for elements of change which have accumulated imperceptibly to coalesce and display themselves under distinctive forms left it untouched. While the classification made by sacred law of casteless men with "elephants, horses, and despicable barbarians" represented a living principle, the distinction between Sûdra and Brâhmana, wide as that between man and beast, might be maintained; but how could this be possible while the priesthood were receiving the former among Aryans in multitudes?

This is but comparatively lately the case, and the fact witnesses to a decay of the religious order, not to its development. In days of old Dâsas had no rights; they could acquire none, so far as the dominant caste was concerned, except through its indifference and loss of power. Even when the Aryas were comparatively newcomers in the Punjab and their intolerance was still intense, the institutes of their law were violated under the influence of expediency. All Dravidians and Kolarians were accursed, but some native tribes were more powerful than others, and a process of compromise began. Political associations and alliances paved the way to a more intimate union, and certain families of aboriginal race pretended to be Rajputs and their claims were allowed. That wreck and confusion inseparable on both sides from protracted war afforded an opportunity

to go back to periods when genealogies became obscure and uncertain. These haughty warriors, who professed to be of royal descent, would have scorned to mix their blood with that of such canaille as their former enemies. The aspirants for that honor, of which there were only individual examples, had therefore to prove a fictitious extraction, nor under the circumstances was this very difficult. A Brahman priest was always at hand to forge a pedigree, invent a family miracle connected with the locality where the tribe settled, and receive the head of a group and his descendants into the fold set apart for "twice-born" Aryas. Not then would a patrician whose line went back *de tout jamais* give his daughter to such an upstart. With his grandsons, however, it was different. The posterity of such people contracted marriages with girls of pure lineage or with the higher class of manufactured Rajputs.

This may be regarded as the first step toward obliterating race distinctions and removing caste obstructions. In "the Middle Land" or Bengal, where this system crystallized, but where also ancient institutions were most corroded and changed through time and a struggle for existence that bore heavily upon overcrowded areas, transitions like the above took place not only in separate instances, but *en bloc*. Sections of native clans or entire tribes gave in their adherence to some Hindu sect, became Vaishnabs, Ramayats, and the like, lost their tribal name, and often their language. Whether there was any intermixture of blood in such cases depended upon local circumstances. These increments soon became indistinguishable, except in physical type, from the Aryans. They worshipped a new set of gods in the old spirit, and were speedily swallowed up among surrounding throngs.

Gradual conversion likewise aided in making good the losses continually taking place through heresy and schism. As was said, it was always impossible to carry out the sacred law literally. Contact, self-interest, and the indifference attaching to a change of faith where nothing is altered but a name, facilitated the movement, and in India, as throughout the East, ritualism is more than religion, and the latter stands instead of nationality. New aggregates were formed by this kind of interstitial change who did not need to account for their origin, whereas where masses went over, priestly aid was essential in order to show that

these aborigines were in reality ancient Aryan septs which had been occulted amidst the storms of past times.

Such is caste, and such were the principal means by which it was modified. How obstructive and destructive it has been; what secret springs of progress have aided in the amelioration of that complex and wonderfully contrasted society it has so long controlled, and how long its influence may yet be felt it is not attempted to say. India has done great things, despite her thwarted energies and arrested growth, much greater than the world in general knows, and whatever is latent within her is now exposed to the quickening influence of Western culture. The new birth will be in a period far removed from ours, but in the meantime her actual accomplishments, what she has suffered, and how her afflictions were sustained may be studied with advantage.

MICMAC CUSTOMS AND TRADITIONS *

BY STANSBURY HAGER

My information about the customs and traditions of the Micmac Indians of Nova Scotia has been derived almost entirely from Abram and Newell Glode, the first a man of seventy-three years, the latter somewhat younger and of exceptionally pure blood for a time when none are wholly so. These two Indians have justly achieved a reputation among their tribe for intelligence and knowledge of their native lore. During the many days I have spent with them at Digby and elsewhere I have invariably found them as eager and interested in being questioned as I was in catechizing them. However, in most cases I have confirmed what they told me by information obtained from others, and I have read to them what I have written in order to avoid mistakes.

It is a misfortune to these Indians that while all their tribe have been taught to read the characters invented by one of the early priests they have been debarred from learning the much simpler Roman characters by the successors of that priest, who until quite recently forbade Micmac children to attend the public schools.

The Micmacs have a system of communicating while in the woods. Sticks are placed in the ground; a cut on one of them indicates that a message in picture-writing on a piece of birch bark is hidden near by under a stone. The direction in which the stick leans from its base upward indicates that in which the party moved, and thus serves as a convenient hint to those who follow to keep off their hunting grounds.

A game much in use within the wigwams of the Micmacs in former times is that called by some writers *altestakun* or *wölłēs takūn*. By good native authority it is said that the proper name for it is *wölłēstōmkwōn*. It is a kind of dice game of unknown antiquity, undoubtedly of pre-Columbian origin. It is played

*The author's thanks are due to Major W. S. Beebe for valuable assistance in the preparation of this paper.

upon a circular wooden dish, properly rock maple, almost exactly a foot in diameter, hollowed to a depth of about three-fourths of an inch at its center. This dish plays an important rôle in the older legends of the Micmacs. Filled with water and left over night, its appearance next morning serves to reveal hidden knowledge of past, present, and future. It is also said to have been used as a vessel upon an arkite trip. The dice of caribou bone are six in number, having flat faces and rounded sides. One face is plain, the other bears a dotted cross. When all the marked or all the unmarked faces are turned up there is a count of five points; if five marked faces and one unmarked face or five unmarked faces and one marked face are turned up one point results; if a die falls off the dish there is no count.

There are fifty-five counting sticks—fifty-one plain rounded ones about seven and a half inches long, a king pin shaped like the forward half of an arrow, and three notched sticks, each presenting half of the rear end of an arrow. These last four are about eight inches long. Three of the plain sticks form a count of one point; the notched sticks have a value of five points, while the king pin varies in value, being used as a fifty-second plain stick, except when it stands alone in the general pile. Then it has, like the notched sticks, a value of five points. Thus the possible points of the count are seventeen (one-third of fifty-one) on the plain sticks and fifteen (five times three) on the three notched sticks, a total of thirty-two; but by a complex system the count may be extended indefinitely.

In playing the game two players sit opposite each other, their legs crossed in a characteristic manner, and the dish or *woltes* between them usually placed on a thick piece of leather or cloth. A squaw keeps the score on the counting sticks, which at first lie together. The six dice are placed on a dish with their marked faces down; one of the players takes the dish in both hands, raises it an inch or two from the ground, and brings it down again with considerable force, thus turning the dice. If all or all but one of the upturned faces are marked or unmarked, he repeats the toss and continues to do so as long as one of these combinations results. When he fails to score, the amount of his winnings is withdrawn from the general pile and forms the nucleus of his private pile. His opponent repeats the dice-throwing until he also fails to score. Two successive throws of

either a single point or of five points count thrice the amount of one throw—that is, three points or fifteen points respectively. Three successive throws count five times as much as a single throw, etc. After the pile of counting sticks has been exhausted a new feature is introduced in the count. The player who scores first takes a single plain stick from his pile and places it by itself, with one of its sides facing him to represent one point, and perpendicular to this, either horizontally or vertically, to represent five points. He continues to add sticks thus as he continues to score. This use of the sticks as counters to indicate unpaid winnings is a device for deferring further settlement until the game seems near its end, and also serves to increase the count indefinitely to meet the indefinite duration of the game, as after one player secures a token his opponent when he scores merely reduces the former's token pile by the value of his score. The reduction is effected by returning from the token pile to the private pile the amount of the opponent's score; hence at any time the token pile represents the amount of advantage which its owner has obtained since the last settlement. These settlements are made whenever either party may desire it; this, however, is supposed to be whenever one player's token pile seems to represent a value approaching the limit of his opponent's ability to pay. If his opponent should permit the settlement to be deferred until he were no longer able to pay his debts, then he would lose the game to the first player; whereas if one player after the settlement retains five plain sticks, but not more, a new feature is introduced which favors him. If while retaining his five sticks he can score five points before his opponent scores at all, he wins the game in spite of the much greater amount of his opponent's winnings up to that point. If his opponent scores one point only before he obtains his five points he still has a chance, though a less promising one. After paying over the three plain sticks that represent a single point, two plain sticks still remain to him; he is then compelled to win seven points before his opponent wins one, or he forfeits the game; but if he succeeds in winning his seven points the game is still his. However, in these last chances he is further handicapped by the rule that he can at no time score more points than are represented in his private pile; consequently, if with only five plain sticks in his possession he could score only a single point, even if his toss

should call for five; but with six plain sticks he could score two points; with nine sticks, three, etc. The last chances are: With only five plain sticks, five points are necessary to win; with four plain sticks, five points are necessary to win; with three sticks, six points; with two sticks, seven points; with one stick, seven points.

There are two other minor rules: one, that in counting five points on the plain sticks four bundles of four each are given instead of the five bundles of three each, as one should expect; total, sixteen. The other rule is that to count six points we use a notched stick plus only two plain sticks, instead of three, as might be expected.

It will be seen that the complex counting system of this game presents marked inconsistencies. Ingenuity of a high grade exists side by side with features which can only be regarded as extremely clumsy when viewed from the standpoint of simple utility. Granting the necessity for using three plain sticks to mark a count of a single point, the method by which the results are simplified is admirable; but what is the necessity for using three sticks instead of one to represent a point? The apparently needless confusion which results directly from this feature will be patent to any one who attempts to explain the game in his own language. Why did the inventive genius of the race simplify the results of a clumsy start instead of simplifying the start itself? Does it not seem that it would have done so unless there had been some motive other than that of utility for the retention of this feature? Through almost all the customs, dances, and legends of the Micmac, as through those of all peoples not affected by our literal modern civilization, there runs a vein of mystic or allegoric motive, and here must we look for the explanation of the woltes or dish. When we examine the numerical combinations of the game the preponderance of odd numbers is noticeable. We are dealing with 1, 3, 5, 7, 15, 17, 51, and 55, and most of these numbers occur in several distinct relations. The only even numbers that we encounter are 52, 32, and 6, the first two occurring but once and the last twice, though in an insignificant position. This agrees well with the observations of Dr. Rand and Mr. Leland of the remarkable respect in which the number 7 is held by the Micmacs. It would thus seem that they are believers in the luck of odd numbers. Is it chance, moreover, that two of the even

numbers (52 and 32) and one of the most prominent of the odd (17) are intimately associated with time relations among the Indians of Central America? The number 52 among the Maya is the *ahau katun* or great cycle of years, and is divided into two smaller cycles of 20 and 32.

If we turn to the materials of the game we obtain further suggestions. The circle about the perimeter of the dish and the cross on the dice and on the king pin provide two figures which throughout America are connected with the calendar. Moreover, it can scarcely be chance that if we put together the straight sides of two notched sticks and attach the king pin at one end of them we obtain the unmistakable representation of an arrow.

The arrow whose point is single and whose rear end is bifurcate is to be found in many mystic associations in America. For example, it occurs in the hands of two of the converging rows of figures on the so-called Great Gateway of Tiahuanacu, Bolivia, and also in the left hand of the central figure on the same monument. We meet with it again figured on a bowl which Squier brought from Nicaragua, where the three arrow-points alternate with three feathered tips, thus giving the alternate stellar interlacing, which is one of the most conspicuous ornaments on the façade of Uxmal. In this connection we may consider the magic arrows of Glooscap, the Micmac demigod, which arrows, to use the words of Mr. Leland, "are, of course, world-wide and date from the shafts of Abaris and those used among the ancient Jews for divination."* Again, this feature suggests the Navajo story of the Apache who came from a hole in the ground and dined with some Navajo opponents until he had won everything that the latter possessed. They were so angry over this that they tied the Apache to an arrow and shot him off into space; but he lived to have revenge, for he brought the whites in three bands and utterly exterminated the Navajo.†

The only other Micmac game of which I have learned anything is *tooādiĭik* or football. The goals were of two sticks placed slantingly across each other like the poles of the traditional wigwam. About a score of players, divided into two parties, faced each other at equal distances from the center of the field. The ball was then rolled in by the umpire, and the object of the

* Algonquian Legends, p. 23.

† Bancroft: Native Races, iii, p. 83.

game was to kick it between the goal posts. In more recent times a player may catch his opponent by the neck and thus hold him back until he can obtain the ball himself, but scalping was anciently employed as a means of disposing of an opponent.

The *choogichoo yajik*, or serpent dance, is well worthy of attention. Newell Glode assured me that very few of his tribe knew anything about it now, and not even he remembered the song of the dance, for he had not heard it since his childhood. It appears to have been suppressed by missionaries.

In performing the serpent dance the male and female participants, in no fixed number, formed a circle, at the center of which stood the head man, who did the singing. The circle of dancers moved first to the right three times around the head man. The dancers then turned their backs to the head man and repeated the revolution three times; next the two sets turned their backs to one another and again moved thrice around the circle; finally, in the same position, they reversed the direction of the motion and move backward around the circle three times. This figure was thus completed in four positions and twelve revolutions, and, according to Newell Glode, signifies the rattlesnake waking from his winter sleep.

The head man now left the circle through the space made for him, simulating a serpent coming from its hole; he led the dancers around the field, making many snake-like twistings and turnings. In one hand he held a horn filled with shot or small pebbles; with this he rattled the time for the step and the song of the other dancers. After they had advanced some distance the last dancer remained stationary and the others moved around the leader in a constantly narrowing circle until all were closely coiled around him. The head man then reversed the direction of the motion and the dancers came out of the circle in line as before. This represented the coiling and uncoiling of the rattlesnake.

Again, the line twisted and turned around the field until at length the head man remained stationary and the last dancer led the line around him as a center, coiling and uncoiling as in the preceding figure. Then the head man resumed the leadership, there were more twistings and turnings, and a third time the line coiled and uncoiled again around the last dancer. Three times, they say, the rattlesnake must coil before it can shed its

skin; therefore, after the line came forth from its third coil the head man led it back toward the point whence it started, and as soon as he moved in that direction the dancers dropped out of line one after another at regular intervals, beginning with the last dancer, until the head man only remained; then the music ceased and the dance was ended.

The authorities seem to be agreed that there are no rattlesnakes in eastern Maine, the Maritime provinces, or any part of eastern Canada, nor is there any evidence that there ever have been any in those localities.* It seems a fair inference, therefore, judging from this dance, that one of the most important features of Micmac ritual has come into Nova Scotia from the southwest. The word *choogich* is indeed but a general name for reptile, according to Dr. Rand, but several Micmacs have assured me that it designates the rattlesnake. The Micmacs assert that the traditional object of the dance was to obtain the poison of the serpent for medicinal use, and that at one time long ago their ancestors used to dance it so much that nearly all of them were turned to serpents. The symbolism of the dance evidently coincides with the time of exuviation. In modern times I cannot find that the performance of the *choogichoo yajik* has been limited to any particular time of the year, further than that it was never danced in the winter; but this might have been due to other than ritualistic causes. It is, however, considered a proper feature at the election of a chief, and the connection of its symbolism with ritual and time relations of some sort is self-evident. In Maya the Pleiades are called *tzabec* or rattle asterism, and altars in the form of the rattle are numerous in Yucatan, as Major Beebe has pointed out to me in the illustrations of Charnay's *Ancient Cities*, pages 140, 149. The scorpion is also connected with the same stars in Maya mythology, and when we hear of the gathering of the poison for medicinal use we may recall the Italian cure for the bite of a tarantula or scorpion by the use of its bane (*similia similibus curantur*). In Peru, Yucatan, Mexico, and in almost all parts of the world this group of stars was preëminent

* Whatever may be the opinion of naturalists in this matter, it is a fact worthy of note that the Indian women of the Hudson bay region, particularly the Cree, formerly drank water in which the rattle of a rattlesnake had been boiled to relieve pain during parturition. See Harmon's *Voyages and Travels* (1800): Lond., 1820, p. 345.—F. W. H.

as time-markers, especially in the first-named countries, in connection with the period of fifty-two years, when its celestial position was carefully noted. Again, the special and ultimate connection of the seven stars with ritual dances in widely distant localities has been noted in the masterly researches of R. G. Haliburton, who says, in his "Traditions of Mount Atlas," "The very words of the song of the Pleiades, who are known in the New World as well as the Old as 'The Dancers,' the 'Celestial Chorus' of the Greeks, the 'Heavenly Host' of the Hebrews, and the 'Seven Dancers' of the North American Indians, are familiar to ears that can catch 'the music of the spheres,' and have been repeated to me by one of those favored mortals, a Susi wanderer from the Sahara.

Oh, Moon, oh, Mother, we hold our feast tonight;
We are dancing before God between heaven and earth.

Words that recall Milton's allusion to those 'morning stars that sang together with joy' at the creation.

And the Pleiades before him danced,
Shedding sweet influence."

As to the Micmac tradition of the transformation of the dancers into serpents, Squier states that the serpent was prominent in nearly all the mysteries of the so-called Old World, and that in America the rattlesnake was typical of the most arcane ideas. Is it not possible, therefore, that this tradition, literally rendered, would read that in former times this Micmac dance formed an initiation into their esoteric ritual? for we know at least that nearly all if not all the Indian tribes have possessed some such ritual. "Why I am a Serpent" is the title of a work by a native Maya, and in the Maya language *ah ak chapat* signifies both serpent and wisdom. Again, we see by the Micmacs' own interpretation of the dance that it refers to the seasons, and this is not surprising, for, alike in Persia, India, Egypt, and Mexico, exuviation was the peculiar symbol of the year. It seems, then, that the existence of this dance among the Micmacs should be considered evidence that they once possessed a ritual having noticeable points in common with that of Indian peoples farther south.

One of the folk-tales told me by Abram Glode was that of the water fairies. Far within a thick dark forest there dwelt a family

in which were two sons. The younger of these when traveling one day along the shore of a lake saw a group of beautiful young women playing ball. He was so pleased with their appearance that he decided to go nearer and watch them. When he approached he found that the girls were dressed in the costumes of the olden time [which, I suspect, means that of nature]. At length one of them perceived him and cried out "*Huaydabay!*" "Look out!" None of the girls had ever seen a man before, and, being alarmed by his appearance, all of them dived into the water and vanished. The young man was much disappointed, for they were so pretty that he wished to capture one of them. Thinking they might return, he made himself small by magic and hid near the spot in a peculiar leaf, which has a kind of cover over its top [probably the jack-in-the-pulpit or the pitcher plant]. This leaf he had previously broken off its stem and placed upon a rock. Presently, as he had hoped, the girls reappeared from the water and renewed the ball game not far from the spot where our hero lay hidden but too far off for him to reach them. When he saw that the girls came no nearer he jumped up and down in the leaf, shaking it nearer to them, but when he had nearly succeeded in reaching them one of their number again espied him and cried out as before. Again the fairies plunged into the water and disappeared, leaving the young man more disconsolate than ever, yet more determined to win one of them for his bride. He looked about for some new place in which to hide, and espying a bunch of rushes growing near the water, he broke one off and found within it a little hollow, in which he hid. A third time the water fairies appeared and set about their game, coming very near the rushes in which our hero lay, but a third time something alarmed one of them, and, with the usual cry, they all fled to the water; but this time, however, our hero managed to capture one of them before she could disappear. She begged him to let her go, pleading that she was married, and promising that if he would release her she would bring her younger sister to him on the following day. So he did as she wished, and the next day she returned with her beautiful young sister, who willingly followed him to his wigwam.

The next spring his wife said that she wished to see her father and mother again. The young man consented, and decided to

accompany her; so she led the way to the ocean, carrying her child in a case on her back. Arrived at the shore, she continued straight on into the water, where her husband was at first afraid to follow her. At length, however, she managed to overcome his fears, and he went with her, even under the surface of the water. Things soon began to appear to him much as in the upper world. After a journey they came to a large village in the midst of a hard-wood country of wondrous beauty. "My father is chief here," said the wife, and she led her husband and child to his wigwam, where they were hospitably received. All kinds of fish dwelt in the village, and the chief and his wife were themselves fish below the waist. The chief was the ruler of all the fish. Our hero and his wife passed some time very pleasantly with the parents of the latter, but at last he wished to return to earth. He and his wife had not gone far, however, when they were pursued by an enormous shark, and after a wearisome flight the wife's strength began to fail her. Then she took off her case in which she carried her child and fastened it upon her husband's back, so that it might be saved. "Do not wait for me," she said, "but flee yonder," pointing to the sun, "and you will reach the shore at the point where we left it. If I am saved I will follow you." Our hero did as she directed, and when he reached the shore sat there and waited for a long and weary time, but his wife never appeared again. At last he knew she must have been slain by the shark, and so he went sorrowfully home.

Curious enough is the commentary which my Micmac host attached to this tale. "When Moses led the children of Israel through the Red Sea one woman was drowned, and she became a fish from her waist downward. I think she was the same woman who was lost in this tale." The Micmacs frequently connect some feature of their legends with a biblical episode which to our eyes bears little resemblance to the point in question.

The student of Indian mythology will recognize that this tale of the Water Fairies is but a variant of the Chippewa legend of the "Magic Circle in the Prairie." Nevertheless that legend presents some curious contrasts when compared with the Micmac version. In the former the home of the bride is in the upper world of the stars instead of in the under world of the sea, and birds take the place of fishes, but the dancing girls are present with their game of ball, and the youngest of them is captured by the hidden hero, etc.

Another legend is of the *culloo*, the most terrible of creatures. So large was this winged monster that it could dispose of any animal at a single swallow. It had a huge nest on a very high cliff, which no man could possibly scale. Thither it would bring moose and caribou with which to feed its young. One day the monster captured a man who was hunting moose and carried him to its nest. It was the custom of the *culloo* when it reached home to beat its victims to death on the rocks, so it proceeded to dispose of the hunter in this manner. But the hunter had kept hold of his bow and arrow, and when the monster attempted to destroy him he saved himself by keeping his weapon underneath him, so that the pressure upon him simply bent the bow. For some reason the *culloo* failed to discover this, and after pounding the hunter against the rock till weary, found to its great amazement that he was still uninjured; so it departed in search of other food, leaving the man in the nest. Soon the hunter began to cut up pieces of meat with his knife and to feed them to the two young *culloos* in the nest. These were so pleased with this novel method of serving food that on the return of their parent they interceded for the hunter's life. The request was granted, and the hunter resided with the *culloo* family until the members thereof became quite attached to him. Once there arose a terrible storm, and then the younger *culloos* crawled under their parent's wings like chickens under a hen. The hunter went to the same refuge, and the *culloo* brooded over them all till the storm was over. But the man longed to return to his home, so in devising a means of escape it occurred to him to kill one of the young *culloos*, skin it, and try to use its wings for his own benefit. At once he put the project into execution, but just as he was adjusting his borrowed plumage the parent *culloo* returned. The hunter, nothing daunted, quickly managed to adjust his wings in a sort of half-way fashion, and then jumped off the cliff. The *culloo* saw at once what had occurred and angrily pursued the winged man; but the man fell uninjured upon the tree tops, and scrambled to the ground only an instant before the *culloo* descended on the same tree. Owing to its immense size, the *culloo* could not penetrate below the tops of the trees, and so our hero was saved. The defeated monster then returned to its nest, in which there was now only one young bird. That one will not be big enough to fly until the last day.

It is easy to see some analogy between this legend and the Illini myth of the Piasa. Newell Glode related it to me immediately after I had told him about the Piasa, and himself commented on the resemblance.

These last two traditions were selected at random from a collection of thirty or more obtained by me this summer. It is a good indication of the extent of Micmac legendary lore that of the many tales related to me all but one or two are new to us, in spite of the years of research of such able investigators in the field of Micmac folklore as the late Rev. Dr. Rand, Mr. Leland, and others. The knowledge of these myths is rapidly disappearing; but few Micmacs now know anything about them, but with those few the most insignificant peculiarities in animate and inanimate nature often suffice to call to mind some new old story.

**THE WRITINGS OF PADRE ANDRES DE OLMOS IN THE
LANGUAGES OF MEXICO**

BY JAMES C. PILLING

Among the early missionaries who came to New Spain to teach and convert the natives, one of the earliest and most prolific writers was Padre Andres de Olmos. Born about 1491, he was a native of the archbishopric of Burgos, in Spain, near Oña (miscalled Ocaña by one of his biographers), and was sent to Olmos, near Valladolid, whence his name. Here, when about twenty years of age, he entered the university and joined the order of Franciscans, and distinguished himself as much by his learning as by his piety. He was sent by the Inquisicion first to Biscay in company with Bishop Zumárraga, who went by order of Charles V, and afterward to Mexico, also with Zumárraga. Promoted to the episcopate, and wishing to have for the accomplishment of his apostolic labors in the new world an intelligent and devout assistant, Zumárraga cast his eyes upon Olmos. Full of zeal and robust, though of medium size, the intrepid Franciscan answered perfectly the expectations of his superior. He remained in the new world from 1528 until his death, in 1571. He became well versed in the languages of the country, particularly those of the Nahuatl, Totonaca, Huasteca, and Tepehuana, "in which he excelled," says Torquemada, and in each of which he composed a number of books. He is also said to have been familiar with the Chichimi, spoken near the Floridian boundary, but I have found no mention of any work by him in this dialect.

The ardent missionary traveled through several provinces, always on foot, over mountains and through forests, exposed to many privations and dangers. Many times during his forty-three years of unceasing labor he was threatened with death by the Indians, but was able to escape, and even succeeded in making himself loved and admired by them. From very far they came to hear his sermons, follow his lessons, and give him evidences of sympathy and gratitude.

Despite a life of unremitting labor and despite serious infirmities, Andres de Olmos reached a ripe old age, and died at Tampico the 8th of October, 1571, from the result of an abscess, and was buried in one of the seven convents which he had founded.

From Siméon's Introduction to the *Grammaire Nahuatl*, Paris, 1875, I quote the following:

"Olmos had taught Latin at the college of Santa Cruz, at Mexico, in the chair that a Frenchman, Arnaud de Bassace, had been the first to occupy. He translated first into Spanish the *Adversus omnes hæreses*, libri xiv, of the Franciscan Alonzo de Castro, and two letters written by two rabbis. Then he composed linguistic works on three of the Mexican idioms and some books of piety in these same idioms.

"The *L'Arte de la lengua Mexicana* forms the object of the present publication. As for his other works, we like to think that they are not all lost. In the time of Betancourt (*Teatro mexicana menologio*, Mexico, 1698, p. 138) the grammar, vocabulary, Christian doctrine, and the confessional in the Huastèque tongue were preserved at Ozolocama, near Tampico.

"There exist a sufficiently large number of grammars of the Mexican language, printed or manuscript, which the missionaries, for the most part Spanish, composed at various times to facilitate the conversion of the Indians by the devout of their order. Many of these have become extremely rare and sell sometimes at exorbitant prices. We will mention as of the first rank the grammar of the Jesuit Horacio Carocho (Mexico, 1645), the most universally known, and the abridgment of which another Jesuit, P. Ignacio de Paredes, made in the following century (1759). Afterward there were various elementary treatises due to the Fathers Alonso de Molina, Antonio del Rincon, Betancourt, Augustin Aldama, and others; but these last works, for depth as for extent, are far from being equal to the *Arte* of the Franciscan Andres de Olmos. Finished in 1547, this work preceded by twenty-five years the grammar of Alonso de Molina, the most ancient of all those which have been printed. One may say that Andres de Olmos opened and prepared the way for grammatical studies in the Nahuatl language.

"After having named the two Spaniards, Francisco Ximenez and Alonso Rengel, who were the first grammarians in this language, Juan de Torquemada immediately mentions de Olmos and thus expresses himself: 'It was he that above all had the gift of languages, because in the Mexican he composed the most copious and useful *Arte* of all those that have been made, and he composed a vocabulary and many other works which are counted in his life, and he made the same in the Totonaca language and in the Guasteca; and I understand that he knew other languages, among them the Chichimecas, because he spent much time among them.' Further on, in speaking of the *Arte de la lengua Mexicana*, the same author adds: 'A thing very particular and of much erudition,

and from it I have profited in knowing the language profoundly and making it plain to those to whom I have read it.'

"Moreover, it would not be difficult to show that his manuscript has served the grammarians and lexicographers who came after him, for they have often given the same rules and the same examples; but that is not its only and chief merit. As complete as it is exact, the grammar of Andres de Olmos recommends itself by its order, clearness, and conciseness. The principles are excellent, the choice of examples irreproachable. As for the method of exposition which he has followed, Olmos, not daring to repudiate the ideas of his times, proceeded generally according to the Latin grammar of Antoine de Lebrixa. This assimilation of the simple and frequently rudimentary forms of the Nahuatl with the more complex and learned forms of the Latin is, according to us, a capital fault, common, as for that, to the greater number of works which have appeared till now upon the ancient languages of the new continent. A little later, when we shall be permitted to publish [since printed] our general Mexican grammar, now in preparation, we will develop this important subject in treating of the particular character of the proposition, and, by the analysis of the various forms of the Nahuatl language, we will try to show at what point and under what bearings it differs from the languages of Europe. For the present we must limit ourselves in making known the book of A. de Olmos.

"One will be astonished, without doubt, that a work of so real a value should have remained unpublished, and we cannot better explain this fact than by referring to the prologue of the editor. It will be seen there that the printing of this grammar was attempted several times without success, and that it fell through notably in 1562, in consequence of the death of an illustrious protector of Olmos, Francisco de Bustamente, who, during a voyage to Spain, was charged to solicit the privilege of the king, Philip II. One will conclude with us that an edition of the grammatic treatise of Olmos could not have been given to Mexico in 1555, as a statement in the *Cuadro descriptivo y comparativo de las lenguas indigenas de Mexico* by M. Francisco Pimentel (Mexico, 1862, vol. 1, p. 162) would make it appear. Thus we print the *Arte de la lengua Mexicana* by the Franciscan de Olmos as a work, in our opinion, entirely unpublished.

"According to the title of the work itself* and the note which ends it Olmos composed his grammar when he was superior of the Franciscan convent established at Hueytalpan. He was then about 55 years old and had lived in Mexico twenty years. His varied knowledge in lin-

* A hand other than that of the copyist has written the title on the first leaf of the copy of the manuscript of this grammar which the Bibliothèque Nationale possesses. In reproducing it we have been obliged to rectify it, and particularly to substitute for the supposed name of Fr. Andres de los Olmos the only recognized and veritable name of Fr. Andres de Olmos.

guistics had then been strengthened by long practice in the exercise of a laborious apostleship. A mind cultivated and hungry for knowledge, he made learned researches, and neglected nothing in studying thoroughly the old land of the Aztecs. Not content with learning what usage and observation could furnish him each day, he took pains to consult the Indians worthy of consideration, through their knowledge or through their social position. Thus Juan de Torquemada (*Monarquia indiana*) tells us that Olmos, during a long sojourn at Tetzcuco, united himself with a noble old Mexican, remarkable for the extent of his information, and occupied himself with him in questions of antiquities of very keen interest. The same writer assures us that Olmos had recorded the substance of these archeologic conversations in one of his works. His great love for study still shows itself in the grammar which we are publishing, and it is that which explains the esteem which it has constantly enjoyed.

"This grammar, in which the author declares he has employed scarcely any expressions not in general use in Mexico at Tetzcuco or at Tlaxcala, is divided into three parts.

* * * * *

"The work terminates with the text of the first of the exhortations or admonitions which Olmos had collected under the title of '*Platicas que los senores mexicanos hacian sus hijos.*' This bit of Nahuatl literature, to which the pious Franciscan sometimes added Christian thoughts, is followed by a short declaration or imitation in Spanish. We have accompanied it by a French translation as literal as possible. One will judge without doubt that this part of our work has not been the least difficult.

"According to Betancourt, a clever Mexican writer at the end of the sixteenth century, Juan Baptista had reunited these same discourses with those of the kings to their vassals under the general title of *Huehuellatolli*, or antique discourses. A copy of this precious collection, published in Mexico in 1599, was sold in London some years since."

But little of Olmos' work has been printed—a doubtful *Arte Mexicana*, in Mexico in 1555, and a still more doubtful *Gramatica et Lexicon* in three of the native languages, in Mexico in 1560—titles of which, with authorities, are given below. It was left for the present generation to give the students of philology the benefit of his work. From time to time copies of his manuscripts were discovered, and from two of them there were composed and printed in Paris in 1875, under the direction of the Commission Scientifique, a *Grammaire Nahuatl*, and in the City of Mexico in 1885 an *Arte Mexicana*; full titles and collations of these are given below.

But the greatest interest attaches to his manuscripts and copies of them. As it has been my good fortune to see several of the more important ones, it is of these I wish principally to speak.

PRINTED WORKS.

Arte Mexicana, 1555 (?).

Arte de la lengua Mexicana. Mexico, 1555.

Title from Beristain's *Biblioteca Hispano-Americano Septentrional*. The author does not claim in so many words to have seen the volume, but speaks of it in such manner as to indicate that he had :

“This work is dedicated, in Latin letter, very chaste and very learned, to the Bishop of Tlaxcalla, Dr. D. Fr. Martin de Hojocastro, he being Comisario-General of New Spain. Torquemada used the work for learning the idiom and for teaching it to others.”

As will be seen below much doubt exists as to whether this was printed at the early date mentioned. Indeed, it is almost certain that it was not printed at all.

The learned bibliographer, Sr. Joaquin Garcia Icazbalceta,* in his *Apuntes para un catalogo de escritores en lengua indigenas de America*, Mexico, 1866 (p. 153, no. 88), speaks of it as follows :

“That this *Arte* (or another by the same author) was printed in Mexico in the year 1555, I have always doubted, and now doubt the more, because in this manuscript of 1563 nothing is said of its having been printed eight years before, though the author gives a history of the book. Certain it is that no one claims to have seen the edition of 1555, and the opinion favorable to its existence is supported, so far as I know, by but one passage, not very clear, in the additions to the *Bibliotheca Univera Franciscana* of Fr. Juan de San Antonio.”

Gramatica et Lexicon Mexicana, 1560 (?).

Gramatica et Lexicon Linguæ Mexicanæ et Huastecæ. Mexico, 1560, 2 vols., 4°.

Title from Clavigero's *Storia Antica del Messico*, Cesena, 1780. Vater's *Litteratur de Grammatiken*, Berlin, 1847, gives it the dates

*This gentleman, among the best of bibliographers and one of my warmest personal friends, died suddenly at his home at San Cosme, Mexico, November 26, 1894.

1555, 1560. Adelung's *Mithridates*, Berlin, 1806-1817 (vol. 3, pt. 3, p. 92), gives the title also and adds: Cum Cathecismo, Evangeliiis, Epistolique Mexicanice, Mexico, 1560, 2 vols., 4°. Neither Beristain, Brunet, Rich, nor Ternaux-Compans mentions the work, and it probably never was printed. Sr. Icazbalceta, in speaking of the work titled next above, adds this note: "Still less do I believe in the existence of the *Arte y Vocabulario de los lenguas Mexicana, Totonaca y Huasteca*, which it is asserted were printed in Mexico in 1560.

Grammaire Nahuatl, 1875.

Grammaire | de | la langue Nahuatl | ou Mexicaine, | composée, en 1547, | par le franciscain André de Olmos, | et | publiée avec notes, éclaircissements, etc. | Par Rémi Siméon. | [Monogram.] |

Paris | Imprimerie Nationale. | MDCCCLXXV [1875].

Half-title: Mission scientifique | au Mexique | et dans l'Amérique Centrale. | Ouvrage | publié par ordre du Ministre de l'Instruction publique. | Linguistique.

Half-title: Grammaire | de | la langue Nahuatl | ou Mexicaine.

Half-title verso blank, 1 l.; half-title verso blank, 1 l.; title verso blank, 1 l.; introduction (Paris, February 1, 1875), pp. iii-xv; half-title (title of the Bib. Nat. copy of the manuscript) verso blank, 1 l.; heading, "Comienca," etc., p. 3; Epistola nvncvpatoria, pp. 3-5; Prologo al lector (Bib. Nat. copy), pp. 7-11; Prologo al benigno lector (from the Maisonneuve copy), foot-note, pp. 7-8; text, pp. 9-230; Platica, pp. 231-264; colophon from the original manuscript, p. 264; Indice, pp. 265-273; corrections, p. [274], 8°.

In this work the editor has mainly followed the manuscript copy belonging to the Bibliothèque Nationale because of its conformity to the plan adopted by the author. He noted with care, however, the variations in the Maisonneuve copy, and utilized the latter as far as his judgment warranted. Such changes are duly noted.

I have seen copies of this in the following libraries: the Astor, New York; Boston Public; Dr. D. G. Brinton's, Media, Pennsylvania; British Museum; J. H. Trumbull's, Hartford, Connecticut, and in that of Yale College.

Arte Mexicana, 1885.

Arte | para aprender | la lengva Mexicana | compvesto | por Fr. Andres de Olmos, | gvardian | del Monasterio de Sant Andres de Sant Francisco de Veitlalpan en la Provincia de la Totonacapa | que es en la Nveva España. | Acabose en primero dia de henero | del año mil qvinientos y qvarenta y siete años. | Publicado por Mr. Rémi Siméon. Paris. Imprenta Nacional. | MDCCCLXXV [1875]. Reimpreso en México, 1885.

México | Imprenta de Ignacio Escalante, | bajos de San Agustín, num. 1, | 1885

Colophon, p. 125. Fue hecha esta arte en Sant Andres conuento de S. Francisco en Ueytlalhpa, | a gloria de N. S. I. C., año de su nacimiento de 1547.

Colophon, p. [126]. Acabóse la reimpresión de esta Arte | en México, en casa de D. Ignacio Escalante, | á 30 de Enero | de 1886.

Portrait of Olmos recto blank, 1 l.; title verso blank, 1 l.; heading, "Comienca," etc., p. 3, followed by the *Epistola nvncvpatoria*, pp. 3-4; Prólogo al lector (from the Bib. Nat. copy of the manuscript), pp. 5-7; Prólogo benigno lector (from the *Maison-neuve* manuscript copy), foot-note, pp. 5-6; text, pp. 9-125; colophon of 1547, p. 125; colophon of 1886, p. 126, 4°. Practically a reprint of the edition titled next above.

I have seen copies of this in the Astor Library, New York; Boston Public Library, the library of Dr. Daniel G. Brinton, Media, Pennsylvania; British Museum Library; in that of Mr. Wilberforce Eames, Brooklyn, New York; that of Dr. J. H. Trumbull, Hartford, Connecticut; in the Yale College Library, and the one in my own.

Unknown Prints or Manuscripts.

The following titles and notes I take from Beristain's *Biblioteca Hispano-Americano Septentrional*, where it does not say whether any were printed or not.

Vocabulario Mexicano.

Tratado de los Pecados Capitales, en Megicano.

Tratado de los Santos Sacramentos, en Megicano.

Tratado de los Sacrilegios, en Megicano.

Arte y Vocabulario de la lengua Totonaco.

Arte, Vocabulario, Catecismo, Confessionario y Sermone Huastecos.

"In addition to these works, which are given by Torquemada and Betancourt, and several of which I have seen in the libraries of Mexico, Leon Pinelo adds: *Tratado de las Antiquedades Mexicanas*."

In the *Grammaire*, titled above, the following list of Olmos' writings is given on pages v-vi:

En langue Nahuatl.

1. Arte de la lengua Mexicana.
2. Vocabulario.
3. El juicio final.
4. Platicas que los senores Mexicanos hacian a sus hijos.
5. Libro de los siete sermones.
6. Tratado de los siete pecados mortales y sus hijos.
7. Tratado de los sacramentos.
8. Tratado de los sacrilegios.

En langue Huastèque.

9. Arte de la lengua guasteca.
10. Vocabulario.
11. Doctrina christiana.
12. Confessionario.
13. Sermones.

En langue Totonaque.

14. Arte de la lengua Totonaca.
15. Vocabulario.

Sobron's *Los Idiomas de la America Latina*, Madrid [1877], says the *Gramatica Megicano*, the *Vocabulario Megicano-español*, the *Arte* and *Vocabulario Totonaca*, and the *Arte* and *Vocabulario Guasteca* were printed in Mexico. In addition to the works quoted above, Sobron adds the following:

Doctrina christiana in Totonaca, in Mexican and in Tepehua.
Vocabulario in Tepehua.
Confessionario en Mexican.

It will be observed that none of the authorities quoted, except Sobron, give intimation as to whether any of the volumes named

by them were printed. It is almost a certainty none of them were; indeed, all the later bibliographers, myself included, have come definitely to this conclusion.

I come now to existing manuscripts—four copies of the *Arte Mexicana*—which are known, and which are herewith described in the supposed order of their age.

MANUSCRIPTS OF THE ARTE MEXICANA.

The Aubin Copy.

Comienca el Arte de la lengua mexicana compuesta por el Padre Frai Andres de Olmos de la orden de los Frailes menores dirigida al mui Rodo Padre Fray Martin de Hojacastró, comisario gral. de la dicha orden en todas las Indias [etc.].

Colophon.—Esta Arte fue hecha en el monesterio de sant Andres de Ueytlalhpa a gloria de Nro Señor Iesu Crèsto, año de su nacimo de 1547.

“Manuscript, 1 vol., 184 pages, 4°, bound in parchment. Near the end of the manuscript one reads [the colophon]. It treats of the Mexican languages and was published in Mexico in 1555.

“According to Mr. Aubin this manuscript grammar by Andres de Olmos belonged to Las Casas and to Torquemada. There is at the end a long piece of eloquence. ‘It is,’ says M. Aubin, ‘an example of those admirable exhortations still so pleasing in the translation of Sahagun, de Zurita, d’Ixtilzochitl, Torquemada, and others.’”

The first information we have of the existence of this copy, supposed to be the oldest, was while it was in the hands of M. Joseph Marius Alexis Aubin, of Paris, who spent much time in Mexico, whence on his return to France he brought many old and rare documents, original and copies, many of the latter made by himself. This material remained in his possession many years. About 1890 they passed into the hands of M. Charles E. Eugène Goupil, who proposes to divide the collection between the Bibliothèque Nationale and the library of the Trocadero. Before doing so he had made by M. Eugène Boban a very extensive catalogue of it, two large quarto volumes of text, and a third consisting of plates. It is entitled, *Documents pour servir a l'histoire du Mexique. Catalogue raisonné de M. E. Eugène Goupil (ancienne collection de J. M. A. Aubin)*, Paris, 1891. From this work, vol. 2, p. 496, I have taken the above title, or

rather the beginning of it (which is all that is given) and the notes. It is regrettable that the author of the *Catalogue* did not give a much fuller one and a more detailed description of it.

The Bibliothèque Nationale Copy.

Arte para aprender la lengua Mexicana compuesta por fr. andres de los olmos, guardian del monasterio del S. S^a fran^{co} de ueitlalpa en la provincia de la totonacapa. qs. en la nueva españa. acabose en primero dia de henero del año de mil y qs. y quarenta y siete años.

Two blank leaves, ll. 1-119, the text in Spanish, 4°. The leaf of the title page is followed by a blank one, and on the next the grammar begins with the following heading:

Comienca el arte de la lengua mexicana compuesta por el padre fray andres de olmos de la orden de los frailes menores dirigida al muy Reuerêdo padre fray martin de hojacastro comisario general de la dicha orden en todas las indias.

Then follows an Epistola nuncupatoria in Latin, and on l. 5 begins the Prologo al lector, from which it appears that the grammar was the *second* that the author had written or a correction of the *first*. It reads as follows:

Prologo al lector.

Dos cosas, muy amado lector, me compeliaron a poner mano en esta pequeña obra: que fueron la caridad y obediencia de mi prelado, por lo qual no con menos temor que osadia compli este mandamiento deseando a gloria y honra de N. S. I. C. y salud de las almas destos naturales indios, abrir a sus sieruos, si quiera, una senda: la qual, otro quien el fuere seruido darle mas lumbré, haga camino, conociendo a la primera que hize, faltarle mucho en el corte: aunque casi tocase lo principal questa segunda, a la qual, despues de mucho lo encomendar a Dios, parecio darle la orden y traca que lleua, considerando y mirando sobre la mesma materia algo de lo que otros hombres auian escripto por guardar la costumbre de los escriptores, añadiendo y quitando, segun que mejor parecio conuenir, y Dios fue seruido alumbrar: por no yr contra aquel sacro auiso que dize: *ne enteris prudentie tue, quia priuatus spiritus nimis quam perniciosus est.* Lo qual nos da bien a entender san Pablo que con auer sido transportado al tercero cielo, siendole cometida la predicacion por I. C. N. S. y confirmada con miraglos; despues de los catorze años de su predicacion sancta, fue a Ierusalem (segun la reuelacion) con Barnaba y Tito a comunicar y conferir con los sanctos apostoles el diuino euangelio que predicaua entre los gentiles. En lo qual no menos da a entender lo del

sabio que dize: *nil facias sine consilio*. Mayormente en cosa tan ardua como esta, que es querer poner cimiento sin fundamento de escriptura en una tan estraña lengua y tan abundosa en su manera y intrincada. Pues si el sancto apostol, diuinalmente alumbrado y lleno de gracia, acudio a los viuos y diuinos libros que son sus sanctos companeros, quanto mas deue acudir do quier que aprouechar se pudiere, el que tal obra, aunque pequenita parezca, quiere fundar sin el dicho cimiento de escriptura y libros de que estos carecian! A cuya causa con gran dificultad se colige y percibe, de lo qual abundan otros escriptores mayormente en el latin, donde aun cada dia no dexan de hallar, añadir y descubrir cosas, ni se dexan de aprouechar de los sudores de otros; no queriendo de los priuar de su loor y galardón, sabiendo y creyendo que cada qual sera segun sus obras remunerado. Dixe pues senda, o lector, y no camino, por que para tan gran lengua ne me atreuo dezir que baste del todo, lo mucho que a algunos parecera yr aqui, ni se marauillen si algo quedare para que adelante otro añade: *quia facile est inuentis addere*. Mas querer yo dezir en breue lo que, para los nuevos y sin maestro, largo tiempo y platica requiere, seria satisfacerme casi como queriendo de lexos enseñar a alguno un camino fragoso sin medianamente especificarle los inconuenientes, circunstancias y trabajos del. Notorio es del primer corte ningun maestro cortar bien un sayo, y del segundo apenas; por lo qual ruego al deuoto lector que, con la caridad que esto se le ofrece, supla los defectos que en ello hallare, tryendo tambien a la memoria al apostolico sieruo de Dios, que con sancto feruor a estas indianas partes pasare por la salud del proximo tan necesitado, dos cosas, las quales, a mi ver, le deuen mucho combidar y animar al estudio desta senda.

La prima, que con esta pequena luz, a menos costa y trabajo, podra saber, hazer y exercitar lo que desea.

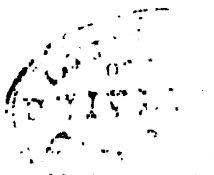
La segunda, que orando y trabajando fielmente, y contiento y discrecion conuersando, *ut si dilectus Deo et hominibus*, sin duda al fin se vera en el cielo acompaño de sus spirituales hijos y de grados de gloria coronado.

Finalmente oso afirmar que qualquier que esta senda seguirle sentira, o sabra mas desta lengua mexicana o tetzcucana en un año que yo xx que ha que viene, por no tener semejante centella de lumbre, ni auer puesto en ello la diligencia que de poco tiempo aca puse.

Diuidese pues esta arte en tres partes: la primera trata de los nombres y pronombres y de lo que a ellos pertenece.

La segunda la conjugacion, formacion y preteritos y diuersidad de los verbos.

En la tercera se ponen las partes indeclinables y algo de la orthographia, con una platica por los naturales compuesta, prouechosa y de buena doctrina, con otras maneras de hablar; ansi para que vean los nuevos como han de escriuir y distinguir las partes, como para saber mas en breue hablar al natural. No hablo en el acento por ser muy vario y no estar ni dexar siempre las dictiones enteras sino compuestas, y porque algunos vocablos parecen tener algunas vezes dos acentos; por lo qual lo dexo a quien Dios fuere seruido darle mas animo para ello, o al uso que lo descu-



bra. Y así como no oso decir que no aya falta en esta obra, así tampoco oso afirmar, en alguna de las reglas generales que aquí van, dexar de aver por ventura alguna eception que al presente no alcanço, o no me ocurre a la memoria. Y si esta arte pareciere larga, deuen considerar que los nuevos no a cada paso hallaran maestro, y como dize S. Pablo: *omnibus debitorum sumus*. Por lo qual el que no sabe algo desta lengua, y aun el que algo alcança, por ventura hallara alguna cosa a su proposito de que aprouecharse pueda; porque breuedad y claridad en una tal lengua no caben. Vale.

In the opinion of Sr. Ramirez the manuscript in the Bibliothèque Nationale is a clear copy of the first (Aubin) grammar, there having been made in it the corrections and additions of which the author speaks in his prologue.

The work is divided into three parts, which are followed by a *Platica* and its translation, the whole terminating on l. 119.

On the verso of l. 112 are these lines:

Fue hecha esta arte en santandres Conueto de S. fr.^o en ueytlalpa a gloria de n. s.^o ix^o año de en nacimi^o de 1547.

After l. 100 several pages are left blank, presumably for the transcription of the last one-third of the metaphors, and ancient expression. There is also a transposition of signatures 15 and 16, whence arises an incorrect numbering from l. 101 to 116, the book having been bound perhaps before being numbered.

Squier, in his *Monograph of authors who have written on the languages of Central America*, New York, 1861, collates this copy of the manuscript as 220 pages.

This copy is said to have been purchased in 1665 for the library of the king from Raphael Trichet du Fresne, a bookseller.

In the summer of 1886 I had the pleasure of seeing this copy of the *Arte* in the Bibliothèque Nationale. Unfortunately in those early days of my bibliographic work I did not appreciate the importance of describing manuscripts, even the early ones, which had been printed, and this I knew had been used in part in the compilation of the *Grammaire Nahuatl*, which had been published in Paris in 1875; hence my notes were few and sketchy and I availed myself of the title and description in Sr. Joaquin Garcia Icazbalceta's *Apuntes*, Mexico, 1866 (p. 148, no. 88), who received the description from Don José Fernando Ramirez, who also owned a copy and from the *Grammaire Nahuatl* of 1875, for several points of desired information.

The Maisonneuve Copy.

Comienca el arte de la lengua mexicana | compuesta por el padre fray andres de ol- | mos de la orden de los frayles menores di- | rigida al muy reuerêdo padre fray Martin de- | Hojacastro comissario general de la dicha ordê | en todas las Indias y al pse. obpo. de taxcala.

Manuscript: one unnumbered leaf, ll. i-cxlv, sm. 4°. The original manuscript is preceded by 2 ll., in a handwriting of the same period, which treat of the manuscript and its author. On the recto of the first leaf, unnumbered, begins the—

Prologo al benigno lector.

Muchas obras (christiano lector) dexan de salir a luz ser inpressas, no porque en ellas aya alguna cosa que reprehender, o menospreciar, sino que o el author de ellas (por algun inconueniente) las dexo por acabar o perfeccionar, o porque despues de acabadas les faltó el fauor y solicitud que se requiera para ser inpressas. De suerte que lo que su utilidad y prouecho les concede la negligencia o poca ventura lo obscurece y occulta. Y de ser esto assi, no menos lastima y compassion causa el zelo y trabajo de el author perdidos que el prouechamiento de que los lectores son defraudados, mas el que en verdadera charidad esta a de sufrir qualquiera pessedo y recio trabajo por euitar porque el sudor y estudio del proximo por este defecto no sea perdido. Pues essa mesma charidad (que todo lo suffice) le dara virtud y esfuerzo para salir con ello al cabo. Y si en el Deuteronomio se mandaua y permitia que el hermano leuantasse la generacion del hermano que moria sin hijos, con iuxta razon los que por charidad y amor estamos coadunados en hermandad, emos de procurar, de restaurar la honrra y bien de nuestro hermano, como a generacion caida y mueria. Vino a mis manos este arte util y necessario para aprender la lengua de los Indios, el qual (por la mucha falta que auia de arte por donde esta lengua ce pudiesse aprender) conpuso un padre de la orden de nuestro Seraphico padre Sanct Francisco, llamado Fr. Andres de Olmos, fraile cierto de muy buenas prendas y partes. Y fue le cometido y mandado (a este dicho padre) la edicion de este libro por el Reuerendo padre fray Martin de Hojacastro, que entonces era comissario general en aquellas partes y despues succedio en obispo de Thlascala, llamando para este parecer a otros muy essenciales frailes de la mesma orden. Conpuesto pues este libro con mucha fidelidad y cuidado, por la falta de inprentas que ay alla, y porque murio a aquella conjuntura el impressor, se dexo de imprimir. Succedio luego en provincial, y despues en comissario el muy Reuerendo padre fray Francisco de Bustamente, grandissimo theologo y lector de theologia en España e Indias, y no menos erudito en la lengua

indiana. Visto por este padre ser libro muy bueno y necessario procuro con grande desseo de le hazer imprimir, y offreciendose le negocios que tratar con su magestad passo en España y trajo consigo esta [sic] arte y un vocabulario de la mesma lengua escripto por otro padre de nuestra sagrada religion. Y estando trando sus negocios murio, cuya muerte fue causa para que la inpression de los dichos libros ne se solicitasse. Despues los ube yo no sin pequena ventura loqual me a engendrado ser nuestro señor seruido que salgan a luz, que no poco contento me daria. Y lo que yo puedo dezir (si mi parecer merece ser admittido) es que sera cosa muy necessaria si inprima y corra, porque (como persona que lo e visto en algunos años que en las Indias e gastado) muchos predicadores venian a dezir dispirates y errores non con malicia, sino con ignorancia y probreza de esta lengua. Y pues es negocio que tanto inporta y modo con que facilmente se aprendera aquella lengua, digno de reprehension seria quien no pusiesse calor y estudio para que su utilidad de todos fuesse participada, tiniendo por blanco a nuestro señor, el qual como a obra suya fauorezca, y a todos nos de su gracia para que en todas las cosas que hizieremos sea nuestro fin y remunerador. Y yo quedo a la correction de todos como hijo humilde de nuestro Seraphico padre Sanct Francisco.

This extends to the recto of the second leaf, numbered i, the verso of which is blank. The third leaf, numbered ii, is headed as above (Comienca, etc.) on the recto, followed by Prologo al lector, gothic letter, which is not a copy of the preceding prologo and which extends to the bottom of the verso of l. iii; contents recto l. iv, the verso of which is blank; text in gothic letters, beginning as follows: Comienca al primero po, ll. v-xxix, containing the first elements, declinations, pronouns, etc.; Division de la 2d parte, ll. xxx-lxxix, treats of the verbs, their formation and conjugation; Comienca la 3d parte en la qual letra, . . . ll. xxx-cx, treats of the different parts of speech, rules of orthography, Spanish and Mexican dialogues, etc. Platica q haze el padre atbyo avisando les amonestando le q se a a buebo, ll. cxj-cxlv, entirely in Mexican.

This manuscript of Maisonneuve presents some irregularities, and has the disadvantage in certain accessory parts of being not entirely as Olmos conceived his work. Thus it includes neither the dedicatory epistle in Latin, nor the Spanish translation of the first *platica*, but it contains the editor's prologue. The presence of this prologue and the absence of the dedicatory epistle would seem to prove that this manuscript is of a date later than

that of the Bibliothèque Nationale. The addition which it carries in the title, "*y al pse obpo. de tlaxcala*," confirms that opinion. Several leaves have on the margin the word *nota*, which recalls the project of publication that a Franciscan, whose name is unknown, had formed subsequent to the death of Olmos. This manuscript offers, moreover, a series, probably complete, of the *platicas* or moral exhortations of fathers to their children. This collection gives it much value, in that this Nahautl text is difficult to procure. The manuscript ends with a list of relative pronouns and by a résumé in Latin of the formation of preterits. These two articles, which do not appear to be by Olmos, add nothing new to the text of the grammar. Several other passages, very short, perhaps apocryphal, have been preserved.

This copy of the manuscript belonged to the booksellers, Maisonneuve et Cie, Paris, France. It is catalogued and quite fully described in Leclerc's *Bib. Am.*, 1867, no. 1097. It was purchased by M. Alph. L. Pinart, and at the sale of his collection, *Catalogue de livres*, 1883, no. 684, was repurchased by the above-named firm for 101 francs. In the Pinart catalogue it is described but briefly: "Made in Mexico in the middle of the sixteenth century, gothic characters, 196 pp., on paper."

From the Leclerc catalogue of 1867 I extract these notes:

"This manuscript, which we can say with assurance is unpublished, although several bibliographers have announced it as having been printed at Mexico in 1555 (see Eguia and Ludewig), is one of the most precious volumes in the Bibliotheca Americana.

"His grammar, which Torquemada cites as a work of great erudition and which he used to learn Mexican, is of great importance for Mexican studies.

"In regard to the other works of Padre de Olmos we refer to the following authorities: Torquemada, Wading, Antonio, Pinelo, and Eguia, who give the list of them. But they certainly have not been printed; at any rate these bibliographers do not mention that they had.

"Two leaves in a handwriting of the time, which are found at the beginning of our volume, confirms us in that opinion."

The work is not mentioned in Leclerc's larger catalogue of 1878, but is in his *Bib. Am. Supplement*, Paris, 1887, no. 340, where it is priced at 800 francs. When I saw it in 1886 it was in possession of Maisonneuve frères et Ch. Leclerc. Whether it has since been sold, and if so to whom, I do not know.

The Ramirez Copy.

[Arte Mexicano, y Declaracion de la Doctrina.]

Manuscript, l. 1 [extraneous], ll. 9-94, in a handwriting of the sixteenth century, 4°.

The following notes I take from Icazbalceta's *Apuntes* (Addiciones y correcciones), p. 150, no. 88:

"The volume begins with a leaf upon which there is a note, in Mexican, in much more modern characters, and which undoubtedly does not belong to the original manuscript. The work begins with l. 9, a part of chapter 5 of the first part; in addition to ll. 1-8, there are also lacking ll. 13-14; the first part terminates on the verso of l. 23; ll. 46-47 are lacking. Between the 48th and 49th there is no leap in the numbering of the leaves, but there seems to be one in the text. On the verso of the 64th ends the second part, and the beginning of the third. The grammar ends with three lines on l. 78, and then continues as follows:

"Declaration de los diez mandamientos en lengua mexicana muy copiosa en lenguaje y en materia hecha el año de 1563.

"A [há] veinte años, o poco mas que hize vna doctrina xpiana en esta lengua mexicana la qual tienē muchos Religiosos en q puse la declaraciō de los diez mandamientos cada vno dellos en tres pūtos. . . . Despues aca he entēdido y procurado de saber las cosas particulares en que estes naturales quebrantan cada vno de los mandamientos y por tanto acorde este año de 1563 ampriar la dicha declaracion, etc.

"This continues as far as page [sic] 88, occupying the recto and a single line on the verso."

Prologo.

En los principios quando esta gente mexicana cōmēço a regebir la sãcta cōmoniō hize vna doctrina que contienen las Reglas q en de guardar los que quieren dignamente llegarse a la sancta cōmuniō es esta que ua al principio deste quaderno a cerca de trienta años q se hizo esta diuulgada ē muchas partes desta nueva España y agora mueuamente la torne a emendar este año de 1563.

On the recto of leaf [sic] 98 is:

Fin del dialogo. Siguiense las quatro oraciones para cōsolar los cēfermos. Actus uera contricionis.

"The manuscript ends with 9 lines on the verso of l. 94. The rest of the page is filled with a paragraph in Mexican, in an entirely different kind of writing.

"Inasmuch as this manuscript bears in various places the date of 1563, we must consider it as later than that in the Bibliothèque Nationale. Comparing it with the long extract which Sr. Ramirez made from the

latter copy, the most notable difference is that the one I have in view lacks the *Platica* and the reply thereto with which the copy in Paris ends, this being replaced by the *Declaracion de los mandamientos*.

"That this *Arte*, or another by the same author, was printed at Mexico in the year 1555, as some say, is a statement I have always doubted, and now I doubt it still more, seeing that in this manuscript of 1563 nothing is said of its having been printed eight years before, whereas the author does relate the history of his book. One thing is certain, nobody says that he has *seen* the edition of 1555, and the opinion favorable to its existence is based, so far as I know, merely on a passage, not very clear, in the additions to the *Bibliotheca Universa Franciscana* of Fr. Juan de San Antonio."

Sr. Icazbalceta had already given an earlier and shorter description of this manuscript in the main body of the *Apuntes*, p. 79, no. 88, where it was classed as anonymous. Subsequent to this Sr. Ramirez sent him from Paris a long description of the manuscript in the Bibliothèque Nationale, which is also given in the *Apuntes*, no. 88 (*Addiciones y Correcciones*, pp. 148-150). He then entered into this longer description of the Ramirez copy. In his first account Sr. Icazbalceta has this note after the paragraph beginning *a [há] veinte años*, etc.:

"This reference carries us back to 1543. But on the verso of l. 88 reference is made to another date still farther back—that is to say, 1532 or 1534, since it says *ha cerca de treinta años*. Thus there is no doubt the manuscript is by some one of the first missionaries."

In the sale catalogue of the collection belonging to Sr. Ramirez, *Bib. Mex.*, London, 1880, no. 604, this manuscript is titled and described as follows:

Arte para aprendes la lengua Mexicana.

"Manuscript of the 16th century, ll. 9-94, 4°.

"After the grammar we have five leaves of an exhortation of a father to his son and his reply and two pages of geographical explanations, the first in Mexican and the last in Spanish.

"It has unquestionably belonged to one of the first missionaries of Mexico. . . . Four copies are known to exist of this work—one in possession of M. Aubin, in Paris; a second copy is in the National Library of Paris, a third in possession of Mr. Pinart, and the fourth is the present copy.

"The late Mr. Ramirez had an opportunity of comparing the first two copies with his own, and, according to his judgment, the oldest copy is that in possession of Mr. Aubin, the next in date that of the National Library, and the most modern the present."

In my marked and priced copy of the Ramirez sale catalogue it is said to have been sold to "Stevens" for 19*l.* 15*s.* I presume Stevens, the London bookseller, is meant. At all events, I saw this copy of the Olmos manuscript *Arte*, or what I then and now suppose to be the same, in the Bancroft Library, San Francisco, in the spring of 1883. As stated above, I did not then realize the advantage of describing manuscripts which had been printed, and hence my notes are not in great detail.

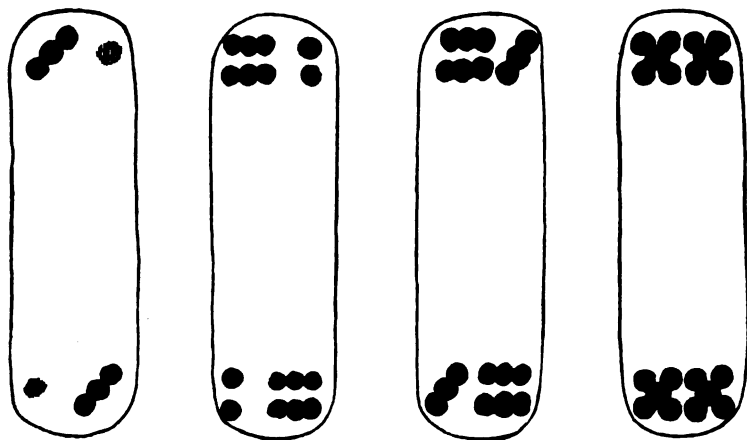
These are the four known manuscripts of Olmos' *Arte Mexicana*. A fifth is mentioned by Siméon in his Introduction to the *Grammaire Nahuatl* as being in the Bibliothèque Nationale de Madrid, the only notice I have seen in regard to it; and if Beristain were always reliable we could add still another copy, a sixth, to the list. In his *Biblioteca Hispano-Americana Septentrional* he says:

"There is in the library of the Santa Iglesia of Toledo a manuscript of the *Arte y Vocabulario Megicanos* of P. Olmos, and the original was seen by Sr. Eguirara in the pueblo of Tlanepantla. Betancourt asserts that the works in Huasteca are preserved in Ozolvama, a town in Tampico. I have seen the greater number of the works in Mexican in the library of the College of San Gregory, in Mexico."

CHINESE ORIGIN OF PLAYING CARDS

BY W. H. WILKINSON

The current Chinese term for both dominoes and cards is *p'ai* (pronounced "pie," as in Tipperary). There is no essential difference between cards and dominoes in China; what are known among foreigners, owing to a superficial resemblance, as "domi-

* FIG. 1 ($\frac{3}{8}$).

noes" are used for the most part precisely as we use cards, and the same game will appear either in the form of a pack of, it may be, coarsely printed slips of pasteboard or as highly finished tablets—"dominoes," in short—of ivory and ebony neatly fitted

* The coloring of the objects illustrated in this paper is represented by heraldic symbolism, the dotted signifying yellow or gold; vertical lines, red; oblique, green; horizontal, blue.

into a sandalwood box. Where a distinction in language has to be made, cards of millboard are styled *chih p'ai*, "paper p'ai," and dominoes *ya p'ai* or *ku p'ai*, "p'ai of ivory" or "bone."

Literary Chinamen of today will use in writing but not in speech two other terms, *yü-p'u*, "slips," and *yeh-tzä*, "leaves." These are the names of two old Chinese gambling games, the first of which was in vogue as early as the third century of our era, while the second was at the height of its popularity about the tenth. Some foreign writers have maintained that both these games were played with cards. Williams, for instance, in his Syllabic Dictionary, s. v. *p'u*, translates the former term by "an old name for playing cards," while Schlegel, as quoted by van der Linde,* plainly identifies *yeh-tzä* with the cards of today. If either of these authorities is correct, playing cards of some kind can be proved to have been in use in China several centuries before their appearance in Europe. The records of the Tsin dynasty, for example, state that a well-known worthy, T'ao K'an (259-334 A. D.), "flung into the river the winecups and *yü-p'u* of his subordinates, remarking, '*Yü-p'u* is a game for drovers and swineherds.'" Yang Kuo-chung, brother of the notorious Yang Kuei-fei, mistress of the Emperor Ming Huang, played *yü-p'u* with the imperial gambler in the palace A. D. 750. In 951 T'ai-tsu, the "High Ancestor" of the Later Chou, assembled his nobles to play together at this game for "embroidered rugs and damask and gauze of sorts." Forty years later *yü-p'u* was put under a ban and all players of it threatened with the headsman, after which the game appears very naturally to have fallen into desuetude.

Yü-p'u, however, *pace* Dr. Williams, was not a card game. Originally, so far as we can judge, it was nothing more or less than the modern poker dice, or something closely resembling it. Five dice were used, colored black above and white below (or perhaps having three of the faces black and three white), and one or more of the black faces was marked with a 2-spot, and similarly one or more of the white: The highest throw was five blacks, "the hound," counting 16; the next was "the cock," two

*Geschichte des Schachspiels, ii, pp. 381, sqq.

white 2's and three blacks, counting 14. Later on *yü-p'u* would seem to have taken a form (while preserving the poker dice) more akin to backgammon, but in all the notices of it as yet examined it would be an abuse of language to call it a game of cards. Before dismissing it, however, it may be worth noting that it is credited, or rather debited, with a foreign origin. Said the old

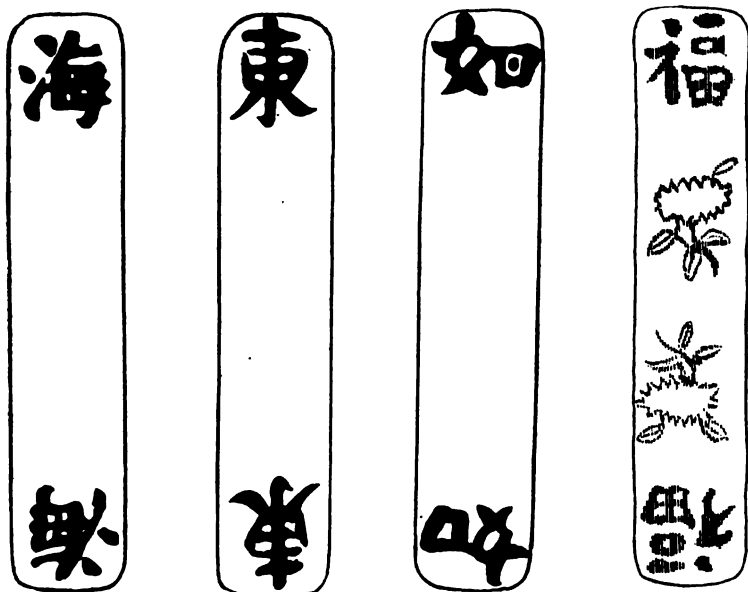


FIG. 2 (¾).

puritan, T'ao K'an, already cited: "Yü-p'u is a foreign game, yet nowadays scholars and officials play it. Can it be that the whole empire is turning foreign?"

There was probably more affinity with cards in the case of *yeh-tzŭ* than in that of *yü-p'u*. Indeed, a native work, of which the date is yet to seek, the *Tan-yen-tsa-lu*, declares explicitly that these "leaves" "were like the modern pasteboard cards." Chinese authorities differ as to the derivation of the term. The most reasonable of them deride the convenient theory that they

were called after the name of their inventor (given by others as Yeh Tzǎ-ching). One writer, who dates their use from the middle of the eighth century, explains their origin thus: In the earlier days of the T'ang dynasty (say the seventh century after Christ), books were written in the form of scrolls. This was found inconvenient for purposes of reference, and books with leaves were substituted for them (the leaves, however, were more like the tablets in common use in England some few years ago for memoranda—that is to say, they were detached or detachable). Among the books thus made up into tablets were works on dice games. As these were in constant use for reference, “tablets” or “leaves” in this way became synonyms for dice, and finally were used in the place of dice—and thus *yeh-tzǎ* grew into cards. The theory is ingenious and derives considerable support from two circumstances: one, the employment to this day in Japan (which obtained all or nearly all its

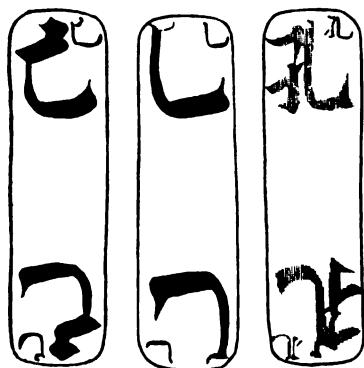


FIG. 3 (2/3).

amusements from China) of card games in which the cards form practically the leaves of a book of poetry; the other, the use throughout western China of packs in which the cards represent, much as in our proverbs, the different words of some well-known sentiment or sentence.

Whatever these “leaves” may have been, the game into which they entered was ex-

ceedingly fashionable during the last years of the T'ang dynasty (618-905 A. D.) and the century following its extinction. China, on the fall of the T'ang, was divided between native princelings on the south and the K'i-tan Tartars on the north—the Tartars from whom China got in Europe the name of Kitai or Cathay. These Tartars took so kindly to the game of *yeh-tzǎ* that one authority declares that “the Kitan were the first to use the game.” He adds, however, that “its origin is not known.” In February, 969, the Tartar

prince assembled his lords to a "tournament of leaves," and in the following month, says the chronicler, he was murdered. Of course the moral is pointed: "Did not evil follow speedily on the use of these unlucky things? Will not the scholars and high officers who now spend their days over them take warning thereby?" What is of far more interest to the western reader, who does not always share the Chinese fondness for a moral, is a scholiast which explains *yeh-tzŭ* succinctly as "Sung money"—that is, coins (or their equivalent) of the Sung dynasty, of which more presently.

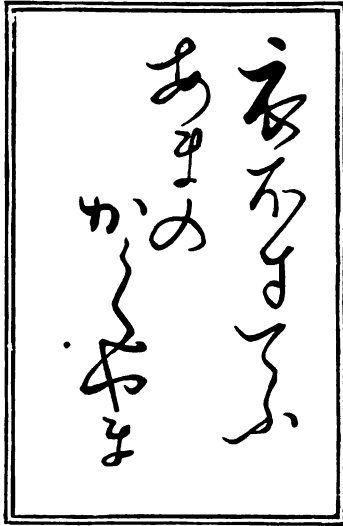


FIG. 4.

References to cards under their present name of *p'ai* are rare in the encyclopedias. Besides the sentence from the *tan-yen-tsa-lu*, already quoted, to the effect that *yeh-tzŭ* were similar to the *chih-p'ai* of today, the only passage so far found is that unearthed several years ago from the *Cheng-tzŭ-t'ung* by the late Abel Rémusat, an armchair sinologue of some repute in his time. This paragraph is alluded to by, among others, Chatto, Merlin, and "Cavendish." The latter (quoting, though without acknowledgment, from Chatto) wrote in his *Card Essays*, "It is stated in the Chinese Dictionary, *Ching tsze tung*, compiled by Eul Koung, and first published A. D. 1678, that the cards now known as *Teen tsze pae*, or dotted cards, were invented in the reign of S'eun-ho, 1120. According to tradition they were devised for the amusement of S'eun-ho's numerous concubines." In his recent article on cards in the *Encyclopedia Britannica* "Cavendish" throws tradition to the winds and boldly fathers the amusement theory on the dictionary itself. The original, however, though quaint enough in its way, is provokingly silent about the concubines; indeed it is strictly seemly, not to say sanctimonious, in its tone. A garbled paraphrase is given by

Chatto, but he omits altogether the concluding and most important sentence: "It does *not* follow that this class of games originated in the period Hsüan-ho" [1119-1126]. A more curious vindication of the tedious maxim about verifying your references could hardly be imagined. Here we have a passage adduced again and again by European writers, from Chatto to "Cavendish," to prove that Chinese cards "were first invented in the reign of S'eun-ho," which passage, when carefully examined, distinctly declares that such a conclusion would be unsound. It is perfectly clear, indeed, that all that was done or asked for in 1120 was an imperial decision as to which of several forms or interpretations of the game now known as *T'ien-kiu* ("Heavens and Nines") was to be considered orthodox. The game and the cards must have been in existence long before. The passage from the *Cheng-tzä-t'ung* runs thus (s. v. *p'ai*):

"Also *ya p'ai*, now the instruments of a game. A common legend states that in the second year of the Hsüan-ho, in the Sung dynasty [i. q. 1120 A. D.], a certain official memorialized the throne, praying that the *ya p'ai* (ivory cards) might be fixed as a pack of 32, comprising 127 pips [sic, it should be 227, but Chinese printers are careless], in order to accord with the expanse of the stars and constellations. The combination 'heaven' [$\frac{4}{8}$, $\frac{8}{8}$] consisted of two pieces, containing 24 pips, figures of the 24 solar periods; 'earth' [$\frac{1}{4}$, $\frac{1}{4}$] also composed two pieces, but contained 4 pips, the 4 points of the compass—east, west, south, and north; 'man' [$\frac{1}{4}$, $\frac{1}{4}$] two pieces, containing 16 pips, the virtues of humanity, benevolence, propriety, and wisdom, fourfold; 'harmony' [$\frac{1}{8}$, $\frac{1}{8}$], two pieces of 8 pips, figuring the breath of harmony, which pervades the eight divisions of the year. The other combinations had each their names. There were four players having eight cards apiece for their hand, and the cards won or lost according as the number of the pips was less or more, the winner being rewarded with counters. In the time of Kao-tsung [1127-1163] pattern packs were issued by imperial edict. They are now known throughout the empire as *Ku p'ai*, 'bone p'ai;' but it does not follow that this class of games, *po-sai*, *Ko-wu*, and the rest originated in the reign Hsüan-ho."

Ko-wu bore some analogy to gobang, *po-sai* was a form of backgammon. The classing together of these with the *Ku p'ai*

curiously resembles the method of Professor Hoffmann in his *Encyclopædia of Card and Table Games*, where dominoes figure among the latter. Whatever may be said of English dominoes, Chinese "dominoes" are, however, most certainly cards, more particularly in the game of *T'ienkin*, here described.

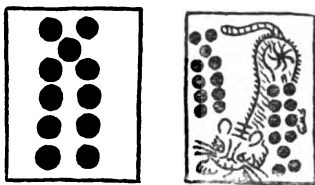


Fig. 5 (full size).

Cards basing their symbols on dice exist in many different forms throughout China, and it is possible with their aid to trace the gradual evolution of these playthings from knucklebones through dice and dominoes. As, however, these cannot be shown to have directly influenced the form of European cards, nothing further need be said about them here.

It is indeed to *yeh tzü* rather than to the *ya pa'i* that we must look not only for the origin of most Chinese paper cards, but for that of European playing cards as well; and the modest scholiast already quoted gives the clue when he explains *yehtzä* by "Sung money." Of all the Chinese varieties, and they are many, no one kind is so uniformly distributed or so universally popular as that described by Chatto under the style of *Tseen-wan che-pae*.* Illustrations of these are given by Breitkopf (whom Singer copies), Chatto, Taylor (and his original, Boiteau), and Willshire; and portions of a pack are contained in the British Museum in a box numbered by Willshire O. C. 293. Perfect specimens, obtained from Peking, Tientsin, Chunking, Kiükiang, Shansi, Honan, Wenchow, Canton, and other parts of China, appeared as Nos. 1 to 17 in a collection of Chinese cards which Mr. Stewart Culin did me the honor to exhibit at the World's Fair last year.† Of the descriptions heretofore given of this class of cards, that by Chatto is the most accurate; that by Willshire the most absurd. They are known in central China by the name of *kun p'ai*, staff or baton cards, or *ma chioh*, "hempen birds." A set contains thirty pieces, namely, the ace, 2, 3, 4, 5, 6, 7, 8, 9 of three suits, now commonly called *ping*, *tiao*, and *wan*

*See Chatto: *Facts and Speculations on the Origin and History of Playing Cards*, 1848.

† Now in the Collection of Games in the Museum of Archæology of the University of Pennsylvania.

("cakes," "strings," "myriads"), and three separate cards, "whiteflower," "redflower," and *ch'ien wan*, "a thousand myriads"—usually styled "old thousand." The game as sold consists, as a rule, of four of these sets or packets, with two, five, or six loose cards, known as "golds," "flyers," or "butterflies." The use of these "golds" is precisely similar to that of *mistigris* in poker or the braggers in the parent game, Hoyle's brag—that is to say, they can stand for and take the place of any desired card. They have, however, no vital connection with the game, which may be, and often is, played without them. No specimens other than those at the World's Fair have so far found



FIG. 6 (2).

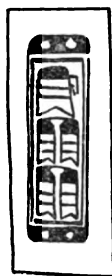
their way into western cabinets; none certainly have been described by European writers. As a rule, they are five in number and carry portraits and emblems representing the "Five Blessings," Luck, Promotion, Longevity, Posterity,

Wealth; but they frequently take other forms. Sometimes they are ordinary cards, just as *quinola*, the knave of hearts, might, as Cavendish puts it, "be made any card or suit" at one of the oldest of European games, *primero*. In this latter case, however, they are distinguished by a blot of gilt or other token.

The suit of *ping*, "cakes," was originally and properly that of *ch'ien* "sapecks" or "cash;" the "strings" are strings of one thousand cash, the "myriads" are myriads of cash. Every one knows the sapeck of China, a round coin of brass and copper, with a square hole in its center. It is as a rule very badly cast, and it is worth just now about $\frac{1}{15}$ th of a cent. This coin, then, is the unit of the *kun p'ai*. In fact, the cards of a *kun p'ai* pack are or originally were *bank notes*, for which and with which the gamblers played. It may be objected that, according to Mayers, bank notes "were invented in China in 1265;" but Vissering* has pointed

* Chinese Currency, Leyden, 1877.

out from Ma Tuan-lin the antiquary (ob. 1325) that T'ai-tsu of the Sung (A. D. 960-976) revived the old system of flying cash used under the T'ang dynasty " (618-905), the "flying cash" being paper money or bank notes. In Vissering's monograph is given an illustration of a note of the Ming dynasty (1368-1644) and a still earlier one of the Yüan (1280-1367) has been recently purchased for the British Museum. If any one will examine either of these he will find upon them illustrations of strings of cash the exact counterpart of which appears in the suit of *tiao* of the *kun p'ai* packs. Assuming, then, and the assumption seems sound, that the *kun p'ai* cards were originally bank notes, the question remains, How did these bank-note cards come to affect, if they did affect, the cards of Europe? The question was anticipated by Singer ("Researches," 1816):

Fig. 8 ($\frac{1}{2}$).

The grotesque appearance of the figures on modern European court cards bears no small degree of resemblance to some representations of the human form in the more rude and early attempts of the Chinese at depicting it. This resemblance has been frequently remarked, but has never, we believe, led to the enquiry whether it was probable that the Europeans obtained the knowledge of cards from thence. As it is certain that they practiced the art of engraving on wood many centuries before it was known in Europe, and as the European card-makers are considered by some to have first introduced that art, a conjecture might be hazarded that they obtained both cards and the means of multiplying them from China by means of some of the early adventurers who, for purposes of commerce, are known to have reached that country as early as the 12th century. Zani says, he adds in a foot-note, "the Abbé Tressan showed him when he was at Paris a pack of Chinese cards and told him that a Venetian was the first who brought cards from China to Venice, and that city was the first place in Europe where they were known." . . . This traveller could have been no other than Niccolo Polo, who, with his brother Matteo, returned from China about 1269, or else the celebrated Marco Polo. . . . Still both the printed text and the various MSS. make no mention of such an occurrence.

That Marco Polo, while speaking, as he does, of the paper money of the Great Khan, should have been silent about his playing cards proves little, for to Polo they would not necessarily be as interesting as to Singer or to Chatto. Nevertheless he may well have brought a pack from China with a hundred other trifles of too little value to catalogue in his book. Nor does Merlin's

objection to the small size of the Chinese cards as compared with the earliest specimens in Europe affect the argument. Even at the present day the cards of western China are far larger than

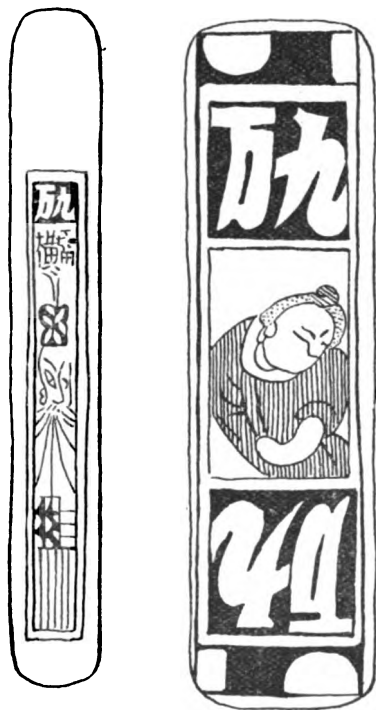


FIG. 9 (full size).

those of Canton (the *petits grimoires* of Merlin), and may well in the Polos' time have been broader still. The narrowness of the modern Cantonese cards is due to the prevailing fashion of holding them in the clenched fist and not spread out fanwise.

The coincidences, indeed, between the first European packs and the Chinese *kun p'ai* are too numerous to be accidental. The earliest suit-marks in Europe, those of Italy and Spain, were *spade* (espadas), "swords;" *coppe* (copas), "cups;" *denari* (oros), "money," and *bastone* (bastos), "clubs." Spanish packs, remarked Vives (ob. 1541), had no 10-spot (Singer, p. 37). The first coat cards were the King, Cavalier, and Servant—Rey, Caballo, Soto. Early

European packs contained emblematic cards, the *naibis*, independent of the rest. In the first games known the cards were used much as in commerce or poker now—to form flushes, sequences, or triplets. Now, if we turn to the *kun p'ai* we find that the leading principle of the games played with them is the same as that in the old Italian Frusso or Primero, while at the same time, like the Tarocchi, the *kun p'ai* packs usually include a number of emblematic cards curiously suggestive of the *naitis*. (Of this more presently.) No Chinese pack contains a ten, the reason for which is clear if we take the cards to have been bank notes, but altogether absent if we call them "cups" and "clubs;" for let us suppose that the suit of *cash* represented notes ranging

in value from one hundred sapecks to nine hundred (as was probably the case, since notes for a single sapeck or for nine sapecks would be ludicrously small); the suits of *strings* and *myriads* on the face of them represent notes for one thousand to nine thousand and for ten thousand to ninety thousand cash respectively. We then have a decimal series of hundreds, thousands, myriads, and a ten of strings would be clearly superfluous, since its place is already taken by an ace of myriads, ten thousands being equal to one ten-thousand.

There is reason, then, in the Chinese suit names, but absolutely none in the European. An attempt has been made to explain the Spanish and Italian suits as emblematic of the four classes of society, clubs standing for peasants; money for tradesmen; swords for the nobility, and cups for the clergy; or, again, as symbols, respectively, of fortitude, charity, justice, and faith. All this is obviously fantastic, whereas if we admit that the first European cards were copied from a Chinese *kun p'ai* pack (or from a still more remarkable one, to be presently described, the *lieh chih*), then everything becomes clear. *Rey* and *Soto* find their prototypes in "Old Thousand" and "Redflower," while *Caballo* represents "Whiteflower," which, Breitkopf observes, "often bears the figure of a horse." (It is, in fact, a stag, but that Breitkopf took it for a horse makes it easy to understand that his predecessors, Marco Polo's Venetian friends, should have done the same.) There are three non-numeral cards in the *kun p'ai* pack; there were three non-numeral cards in those of medieval Europe. Here, again, there is reason in the Chinese game; none in the European. In the Chinese game, which, it should be observed, Messrs. Goodall have lately brought out in English dress under the name of "Kanhoo," the cards are brought together in combinations of three (suggested probably by the number of the numeral cards, $3 \times 3 \times 3$), and hence, whatever the Redflower, Whiteflower, and Old Thousand may originally have been, their *number* was necessarily fixed at three. (In some *Kun p'ai* packs these coat cards, as we should regard them, bear other names, as Wang Ying, Lin Chang, Wu Sung, and Prince of Mao, taken from an old romance of the Robin Hood type, the *Shui-hu chuan*. Whiteflower, again, is sometimes "Sprayflower" or "White Ash.")



FIG. 10 (h).

But no such reasonable explanation can be given of the restriction of European coat cards to three, whether we call them King, Queen, and Knave, or Rey, Caballo, and Soto; nor is it obvious, however natural it may appear to us now, why the coat cards should be superior to the numeral cards. When we remember that the proper name of Old Thousand is "a thousand myriads," or, as we should say, "the thousand of myriads," it

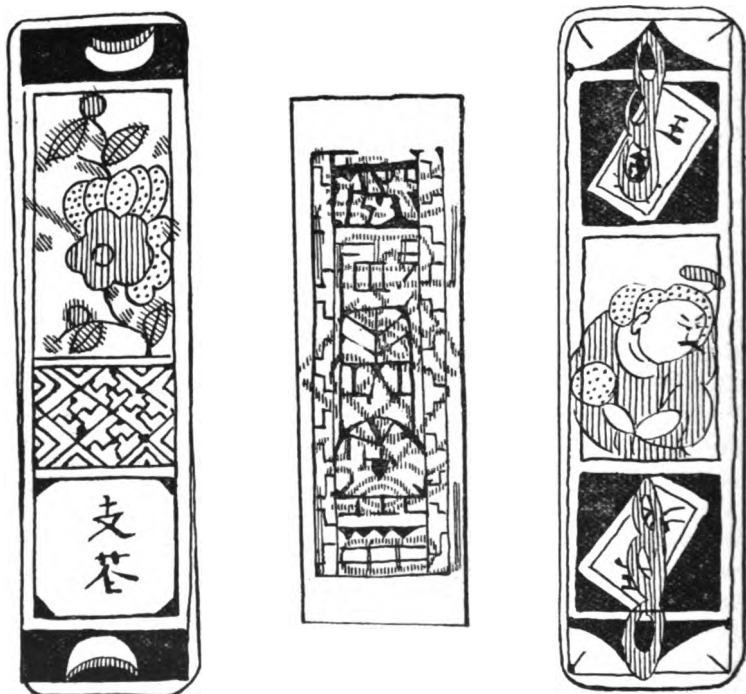


FIG. 11 (full size).

is clear that it must necessarily be superior to all numeral cards, the highest of which is the nine of myriads, for a note for ten millions of sapecks must (or at any rate should) be more valuable than one for ninety thousand. The circumstance, too, that one of the original Chinese coat cards should seem to have a special connection with one of the original numeral suits would explain how a set of coat cards came to be attached in Europe to each suit. It is highly probable, moreover, that Whiteflower

and Redflower were originally marked Ten Myriads and Hundred Myriads, for in a *lok* pack (a variety of *lieh chih*) from Tapu, near Swatow, cards marked "sprayflower," "hundred myriads," "thousand myriads," and "myriad myriads" are found in addition to the numeral suits. ("Sprayflower," as we have seen, is another name for "Whiteflower.") This, then, would explain why one coat card should be considered in Europe superior to another, as the Rey to the Caballo, and not its coördinate, as in "Kanhoo." *Lieh chih*, "waste paper," indeed, throws much light not only on points like these, but also on the remaining difficulty—the fact that the Chinese game has three suits, while the early, like the modern, European has four. The normal *lieh chih* pack consists of thirty-six cards in four suits, arranged thus when the number of players is three:

lakhs: "hundred sons," 9, 8, 7, 6, 5, 4, 3, 2.

rouleaux: 9, 8, 7, 6, 5, 4, 3, 2, 1.

strings: 9, 8, 7, 6, 5, 4, 3, 2, 1.

cash: ace of cash, 9, 8, 7, 6, 5, 4, 3, 2.

With four players two additional cards, Prince of Mao and Stagflower, are used and rank as the two highest *cash*, while the order of the numeral cards in that suit is reversed. In the *lok* pack just referred to the place of Stagflower is taken by Sprayflower, a further proof of the identity of both with Whiteflower.

Now, in the *kun p'ai* game, of which "Kanhoo" is a faithful

copy, the suits are coördinate to one another; no one suit is superior to any other. There is, indeed, no reason why any suit should be superior or any card as the game is now played, for the cards do not take one another, but serve, as in poker or commerce, to form certain combinations. In *lieh chih*, on the contrary, the cards do take one another, and in the very significant order given above—that is to say, the 5 of lakhs (500,000 cash) takes the 4 of lakhs and the 1 of rouleaux (10,000 cash) the 9 of strings (9,000 cash). In the case of two of the suits we find the ace counting before the nine, as in so many European games.

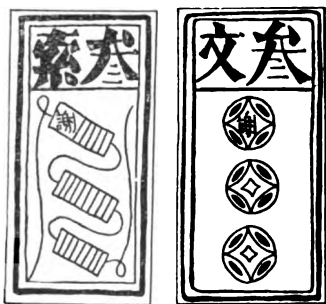


Fig. 13 ($\frac{1}{2}$).

The reason for this is to be found in the *kun p'ai* packs, where aces are valuable because of their mobility (the feature is copied into "Khanhoo") and because they enter into so many combinations. Index or "squeezes" marks are met with in most Chinese packs, and it is often the case that the aces are honored with the same index mark as Whiteflower, Redflower, and Old Thousand, which three, indeed, are sometimes spoken of as *yao*, "aces." In *lieh chih* "Lin Chung" and "Wang Uing" are frequently substituted for "Prince of Mao" and "Stagflower," just as we have seen that in certain *kun p'ai* packs "Prince of

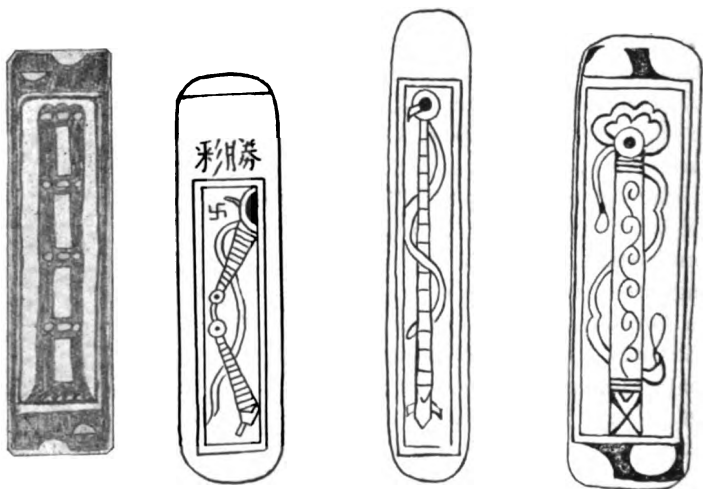


Fig. 14 ($\frac{3}{8}$).

Mao" and "Wang Uing" are occasionally substituted for Redflower. There can be no question, indeed, that both *lieh chih* and *kun p'ai* have the same origin. In the absence of detailed information of early Chinese games it is impossible to say which of the two more nearly represents the primitive form. It is allowable, however, to assume from *lieh chih* that the parent game, packs of which found their way westward in the 13th century, had four suits of 9 cards each, and from *kun p'ai* that it possessed besides three coat cards.


Says Willshire (p. 333): "It is probable that in the perfect sequence there are 5 suits of 9 pieces each suit, the marks of

which are bags, money, batons or bows, swords, and a fifth mark not satisfactorily demonstrable." This conjecture, erroneous as it is, in one way serves a most useful purpose, because it shows what view a European who knew nothing whatever about them would be apt to take of the suit marks of these Chinese games, for Willshire is describing a complete *lieh chih* pack in the British Museum (O. C. 251). If Willshire in 1878 took the *lieh chih* suits to be money, bags, batons, and swords, is it surprising if the Italians of 1278—if that is when they first saw them—took these same suits to be money, cups, swords, and batons? As regards the suit of cakes or cash, indeed it would require very little imagination to hit upon its meaning. Chatto himself says "the mark of the suit of" what he calls "Nines Cakes is nearly the same as that of the old Italian *danari*." This writer elsewhere observes, "in the 16th century it appears that in Italy the suit of *bastoni*, 'clubs,' was also called *colonne*, columns, . . . merely because the club or mace bore some resemblance to a slender pillar." Take a number of *kun p'ai* packs and submit them to various persons who are ignorant of their meaning and it will be found that among the interpretations given to the suit of *strings* those of "swords," "bamboos," "batons," and "pillars" will be the most common, particularly if the ace or the two is the first card shown.

But what of the "cups," the copas or coppe? It is precisely this suit-mark, so altogether inexplicable on any other reasoning, that affords the best proof that the early European cards were derived from the *kun p'ai* or *lieh chih* of China. Take the first three—the ace, 2, 3—of the myriads:

𠄎 ≡ 𠄎 = 𠄎 —

Plainly these are the I, II, III of 𠄎. But unless you know Chinese—which would tell you that this character is the abbreviated form of the hieroglyph for *wan*, "ten thousand"—you would be at a loss to understand it until you turned it upside down. This, being *ex hypothesi* one of Marco Polo's Venetian friends, you would naturally do, because you would be in the habit of read-

ing from left to right and not, as the Chinese do, from right to left. Having once turned the hieroglyph round, no great effort of imagination would be required to see in it the cup. 

The game of Tarocco as played in Italy at the present time is a suggestive compound of the two national card games of China—*K'anhu* (Kanhoo), played with the *kun p'ai*, and *t'ienkiu*, played with the "dominoes"—described in the passage from the *Cheng tzu t'ung* already translated. The Tarocco pack consists of 22 tarots, numbered from 0 to xxi, and of four suits of 14 cards each, namely, the King, Queen, Cavalier, Page, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1 of Money, Swords, Cups, and Clubs. The order of the numeral cards varies with the suit, much as in four-hand *lieh chih*—that is to say, in Swords and Clubs the 10 ranks highest, the ace lowest, while the reverse is the case in Cups and Money. In *lieh chih* the natural order is preserved in Rouleaux and Strings (the prototypes of Swords and Clubs), the 9 ranking above the 8 and the 2 above the ace, while in Cash (the Italian Money) the ace ranks first and the 9 last. The deal in Tarocco, as in so many Italian and Spanish games, passes round "niddershins," the way the sun does not go, precisely as in all Chinese card games. The dealer deals 19 cards to each player and leaves a stock of 2 cards, which the players successively make use of by exchange to better their hands, much as the stock is used at *K'anhu*. Having done this, the players then announce any sequences they may have obtained. In making up these sequences the lowest tarot, 0 (*il matto*, the fool—the joker, in short), is given the privileges of the Chinese "golds"—that is, it can take the place of any required card. So far the principle of *K'anhu* has been followed. The suit-marks are, as we have seen, the *K'anhu* suit-marks. There is the stock drawn on by exchange, the emblematic joker, and the scoring sequence. But after the announcements the game proceeds as in whist, and the cards take one another just as they do at *lieh chih* and *t'ienkiu*. The tarots act as trumps to the other suits, and by a peculiar rule if the lowest of these, not zero—that is, tarot i, *il begatto*—takes the last trick it scores double points.

What these tarots were originally has puzzled all writers on cards, nor has any one, so far as I am aware, ever attempted to account for their number, 22. Yet it is exceedingly probable that in them we have the set of twenty-one natural dominoes which

forms the base of nearly all Chinese card games that derive their marks from dice. A domino is, of course, nothing but a pair of dice placed side by side (whence the mark across its face), and the number of possible combinations of two dice is $\frac{6 \cdot 7}{2}$, or 21. In the game of *t'ienkiu* these dominoes still remain as dominoes, of wood, bamboo, or bone; but in many derived games they appear as pasteboard. In others, such as *hua ho*, "flower-match-

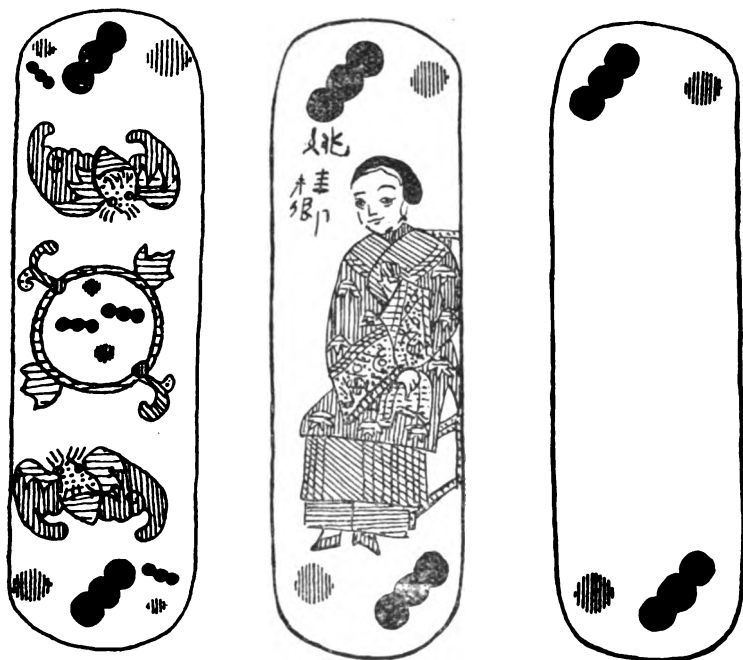


FIG. 15 (full size).

ing" (the original of the Japanese *hana awase*, praised, rightly but ignorantly, by Sir E. Arnold), they may be had in either form; but wherever they enter the number 21 is always present. Take, for example, *hua ho*. Here we have the 21 dominoes in three forms: (a) plain, (b) illuminated, (c) doubled; three of the first, two of the second, and one each of the third—in all, 126 cards, or six times 21, together with a varying number of blanks, which serve as jokers. (Portions of a *hua ho* pack in the British Museum are described, with more than his usual extrav-

agance, by Willshire, O. C. 296, 297.) Moreover, each of the different combinations, $\frac{2}{3}$, 1, $\frac{1}{2}$, $\frac{1}{3}$, and so on, has its name and fanciful signification, as "heaven," "earth," "man," "the trinity;" and as this nomenclature is thoroughly Chinese, there is no real reason to disbelieve, with Merlin, in the tradition given in the *Chêng tzu t'ung*. Further, at *t'ienkiu* the lowest card (the $\frac{1}{3}$, for the $\frac{1}{2}$ ranks second) is allowed, when it takes the last trick, to score double, just as *il begatto* at Tarocco.

Is it unreasonable to believe, then, that in the 21 natural dominoes, the base of so many Chinese card games, we have the origin of the 22 tarots? The Chinese dominoes have their emblematic names, just as the tarots have, and in their pasteboard form constantly are ornamented besides with full-length figures of men and women.

But it will of course be urged, Why are there 22 tarots, then, and not 21? What, however, is the 22d? It is zero, a blank, and its use is to serve as a "joker." But at *hua ho* there are, besides the 21 so-called "doubles," a number (usually three) of *blank* cards, which are used exactly as *il matto* is used. If we assume that the Polos, father or son, brought home with them a *hua ho* pack and a *k'an hu* pack, with directions, rendered somewhat vague by travel, of how to use them, and that their Venetian friends combined these into a single pack, we have an explanation of the tarots and the tarocco game that is at least coherent. The 21 doubles—the most striking of the set—with their full-length figures and emblematic names, would furnish the tarots, the blank (the joker) becoming *il matto*, while from the *k'an hu* game (the *kun p'ai*) would come, as we have seen, the money and the swords, the clubs and the cups. The 10 spot and the queen would be Italian innovations, born of the same ignorance which has added a blank to our European dominoes.

COLONEL GARRICK MALLERY, U. S. A.

American anthropology has sustained a great loss in the death of Colonel Mallery, who died after a short illness, at his residence on N street, in this city, October 24, in the sixty-third year of his age.

Garrick Mallery was born in Wilkes Barré, Pennsylvania. His father, Judge Mallery, was a distinguished jurist and a man of cultivated tastes. Young Mallery graduated at Yale College, and after a due course of study under his father's direction he began the practice of law in Philadelphia.

At the outbreak of the war he entered the volunteer service as captain in the Seventy-eighth Pennsylvania Infantry. He received two very severe wounds at the battle of Peach Orchard, Virginia, in 1862; was captured while lying on the battlefield and sent to Libby Prison, in Richmond. After a while he was exchanged and sent home, and upon recovering from his wounds he returned to duty and became lieutenant-colonel of the Thirteenth Pennsylvania Cavalry. In 1866 Mallery received a commission in the regular army as captain of the Forty-third United States Infantry, and was retired in 1879 in consequence of disability resulting from the wounds received in battle.

At an early period of his army experience at frontier posts Colonel Mallery (the brevet rank of colonel had been bestowed upon him for gallant services) began to take an interest in the customs of the Indian tribes with which he came in contact. He was especially struck with the extent of their sign language and pictographs, and, following up this particular subject of research during his subsequent connection with the Bureau of Ethnology, he brought out from time to time reports of the progress of his work. He made many personal investigations,

and an extensive correspondence furnished him with an immense collection of data and drawings. The result of these researches was embodied in the work, "Picture-writing of the American Indians," which appeared in the Tenth Annual Report of the Bureau of Ethnology. It consists of 822 pages of text, in folio shape, with 1,290 illustrations. Colonel Mallery had the satisfaction of seeing this monument of his industry and ingenious research published in 1894, but a philosophical summary of the results of this vast accumulation of facts upon which he had entered was left uncompleted at his death.

In addition to his ethnological work, Colonel Mallery was the author of many addresses and essays, all characterized by a philosophical vein of thought and much critical acumen. He was known to his intimate friends as a man of large scholarly attainments, and who had a generous acquaintance with the literature of his own and other tongues. To those friends he was greatly endeared by his genial manner, kindness of heart, and high bred courtesy. He was a graceful writer, with the clearness and simplicity of style which belongs to the well-read man. This was the result partly of early education, and perhaps of inherent good taste, but he gave much study to the subject of style in composition. Its application to scientific writings was the theme of his address before the Philosophical Society on retiring from its presidency.

Colonel Mallery was one of the founders of the Anthropological Society of Washington, its president, and for many years an active and zealous member of its Council. In the Philosophical Society, the parent of all the scientific societies now existing in this city, he was an efficient member and its president in 1888.

He will be long remembered with affection by his many friends, and his scientific work is original and of permanent value.

ROBERT FLETCHER.

BOOK NOTICES

Statistics of the Negroes in the United States. By Henry Gannett, of the United States Geological Survey. Published by the Trustees of the John F. Slater Fund in "Occasional Papers," No. 4.

In a prefatory notice to this monograph the trustees say: "Such varied statements are made in the pulpit and press, on the platform, and in conversation respecting the condition of the negro population that it seemed desirable to publish an authoritative paper on the subject. * * * It is hoped that the study of this paper will contribute to the understanding of many problems in education, morals, and politics."

This study of the movement of the negro population by Mr. Gannett is, as all who know him might premise, conscientious, elaborate, and painstaking, and will stand as a valuable contribution to the general history of the African in the United States.

It appears that the number of blacks in proportion to the whites in our population has, contrary to an impression which has prevailed in some quarters, decidedly but gradually declined since 1790, when the first reliable data were obtained, at which time the relative proportions of the population were 80.73 per cent. white to 19.27 per cent. black.

It is now (1894), upon the basis of an estimated population of 61,000,000 whites and 8,000,000 blacks, 88.41 per cent. white to 11.59 per cent. black.

Put in another form, the blacks in 1790 numbered nearly one-fifth of the whole population, and in 1894 considerably less than one-eighth. In only two of the eleven censuses taken has the ratio of blacks statistically increased, namely, in 1810 and in 1880. I find that the average rate of increase by decades in the white population from 1790 to 1860 was 35.74 per cent.; in the black, 28.85 per cent.

"It may be said," remarks Mr. Gannett, "that this diminishing rate of increase in the blacks is due to the enormous immigration of whites; but it can be shown that the greatest increase

of the whites has not been dependent upon immigration, since their rate of increase was greater than the blacks before immigration set in."

This decadence is more likely due to bad sanitary, hygienic, and, in the North, climatic conditions. In the "black belt" the one-room cabin is almost universal, and is not only a sanitary but a serious moral menace to the community.

Mr. Gannett remarks that "these figures and the conclusion necessarily derived from them should set at rest forever all fears regarding any possible conflict of the races."

I am not aware that any such fears have ever had serious existence, excepting perhaps in the South for a short time at the beginning of the civil war, and certainly no fears as to the result of such a conflict could have ever been reasonably entertained at any time in the country at large. Conflicts are always possible, but not always probable.

We have to thank Mr. Gannett for giving a final quietus to the much-preached theory that the negro when left to himself and having perfect freedom of movement would, despite his racial inclinations, drift to the North, where his environment is erroneously supposed to be more friendly.

The census of 1890 shows the center of the negro population, which was in 1880 in latitude $34^{\circ} 42'$ and longitude $84^{\circ} 58'$, or in the northwestern corner of Georgia, not far from Dalton, to be in that year (1890) nearly five degrees, or more than 300 miles, to the south of it, the longitude being nearly the same.

"In the cotton States" the proportion of negroes has in nearly all cases increased until a very recent time; indeed, in two or three of them it has increased up to the time of the last census, while in most of them the only diminution in the proportion has occurred during the last ten years.

All this shows, in the most unmistakable way, a general southward migration of the race.

"The former slave States in which the negroes have decreased are Delaware, Maryland, Virginia, Kentucky, and Missouri and secondarily in Tennessee and North Carolina. There are also areas of decrease in Texas and small areas in other States, but these are of little importance in comparison with the great areas of the border States in which the number of negroes has actually diminished. On the other hand, the most rapid increase of the

race has been in the southern and southwestern parts of the region under consideration, and the heaviest increase is south of the so-called 'black belt.'"

The preference of the negro for the higher temperature of the South is more emphatically shown by the census bulletin No. 199 than by these statements of Mr. Gannett.

It appears that of the 7,470,040 persons of African descent in the United States in 1890, 90.26 per cent. were living south of the forty-first parallel and in the North Atlantic census division, comprising the States of New England, New York, New Jersey, and Pennsylvania, for which the negro is supposed to have a special predilection, we find but 3.61 per cent.

The negro's liking for high temperatures would seem to be in the ratio of the purity of his blood. Of course, the census returns of the number of persons of negro and white blood in the various degrees of mixture can at best be but approximately correct, but the results are generally supported by our observation.

These returns as given show that of the whole *purely* African or negro population in the United States nearly 92 per cent. are south of the forty-first parallel, and of the mulattoes, in the various degrees of blood mixture, but about 81 + per cent. are in that region.

As regards the distribution and density of the negro population nearly all the Northern and Western States, with scarcely an exception, have less than four negroes to the square mile and many less than one, while in Louisiana, Mississippi, and South Carolina more than half the people are negroes, and in South Carolina three out of every five are of that race.

The census of 1890 also forcibly shows us that the negro is not to be excepted in the general drift of population to the cities which is going on all over the world.

Mr. Gannett estimates that in 1860 but 4.2 per cent. of the negroes of the slave States were in cities of 8,000 or more inhabitants; in 1870, 8.5 per cent.; in 1890, 12 per cent.—a ratio of increase much greater than that of the whites in the same period.

The negro is unquestionably gregarious, as Mr. Gannett suggests, but it is very doubtful if it is the principal factor in this movement. It is more likely to be found in the difficulty he has experienced in obtaining a livelihood from the soil because of his ignorance and extravagant methods.

To keep him in the country and upon the land to which by his habits, character, and training he is best fitted, he should be industrially educated in better methods of agriculture. Until this is done the movement will go rapidly on.

Precisely the same drift from the farms to the cities, and resulting from similar causes, is shown in Massachusetts, although our race is by no means so gregarious.

"In 1790, when the first census was taken, the great mass of the people were well scattered over the State, on farms and in towns of less than 2,500 people—frugal, industrious, well-to-do (for those days), and contented."*

Boston was then the only town in the State with over 8,000 population, representing 4.7 per cent. of that of the entire State. In 1885 66.4 per cent., or nearly seven-tenths of its population, were in cities of 8,000 inhabitants and over.

In the country at large in 1790, 3.33 per cent. of its population were in cities; in 1800, 3.90 per cent.; in 1880, 22.5 per cent.; in 1890, over 29 per cent.; "and while our total population in the year 1890 was but sixteen times as great as in 1790, our urban population had become one hundred and thirty-nine times as great."

In England, in 1801, one-third of its population was in towns; in 1881 two-thirds lived in towns. In Norway, in 1801, 9 per cent. lived in towns; in 1888, 22 per cent. In Germany and France the same movement is going on.

In his remarks upon the educational statistics Mr. Gannett appears to give too much importance to the enrollment of the negro school population. "The true test of the application of our school system is not found in the 'enrollment,' but in the proportion of children of school age, educable children, who attend school, to the whole number of such children,"† and the relation between "enrollment" and "education" is of very uncertain value.

The average percentage of colored children of school age "enrolled" in Alabama, Georgia, Louisiana, Mississippi, South Carolina, North Carolina, and Virginia is 47 per cent., but of these only 60 + per cent. attend school. Put in another form, of the 2,000,000 colored children of school age in the District of

* Editorial, Springfield (Massachusetts) Republican.

† Article on "Educational Status of the Negro." A. C. S. Bulletin No. 5.

Columbia and these States, but about 1,000,000 are enrolled, and only 625,000 attend school, leaving 1,375,000, or 68.75 per cent., of the whole colored school population out of school. Of the 2,000,000 whites in the same States of school age, 60 per cent. remain out of school—not a flattering exhibit for either race.

With the movement and distribution of the population and the “illiteracy and education” of the negro we leave behind the valuable and principal part of Mr. Gannett’s paper and pass from the realm of the approximately known to that of the nebulous and the comparatively unknown.

The “conjugal condition” of the negroes manifestly belongs in the latter category, and his criminality is but partially known. The demand of Congress for the conjugal condition, the mortality and pauperism of the country, it is impossible completely to satisfy. This is especially the case in the statistics of mortality and of the conjugal condition, for the simple reason that in many of the States there is no general law requiring the registration of births, marriages, and deaths and no authentic records are available. In the States where there is no general law it is true that most of the cities require some sort of registration. In other States there is a general law governing marriages, but not requiring the registration of births and deaths. In others the registration is voluntary and erratic.

A remarkable instance of the folly and failure of voluntary registration occurred in one of the leading Southern States a few years since, where an examination of the annual report of the State board of health to the legislature revealed the surprising statement that in two counties having respectively over 30,000 and 25,000 inhabitants there were but 74 and 14 deaths respectively during the year.

In the States and cities having proper laws there is a frequent failure by physicians and clergymen to report—a failure which should be corrected by a sufficient penalty. In some instances the neglect has been so great as to cause the partial abandonment of registration and its confinement to deaths only.

A public registration of births, marriages, and deaths was established by the Massachusetts Colony in 1639. As a result of that wise provision Massachusetts is now one of the very few States in the Union in which the increase or decrease of human viability can be even approximately determined during fifty years.

It is scarcely necessary to draw attention to the fact that in the rural population of the "black belt" it is impossible by any ordinary means to enforce a registration law, and the actual death, marriage, or birth rate of such populations is now altogether a matter of conjecture. Any attempted comparison of negro and white pauperism is equally valueless unless founded upon house-to-house visitation and not confined to paupers maintained in alms-houses, as in the present census. "In the South but little provision is made in the form of alms-houses for poor relief."

The actual and growing criminality of the country is a sad history, and its sadness is heightened by the thought that a race which has been mainly dependent upon us for its education and guidance should have a criminal record nearly four times as bad as our own, and further by the fact that, as bad as the record is, it is still far from complete, and that the criminality of both races must be considered as but partially known.

GEORGE R. STETSON.

The Human Bones in the Hemenway Collection in the United States Army Medical Museum at Washington. By Dr. Washington Matthews, Surgeon United States Army, with Observations on the Hyoid Bones of the Collection by Dr. J. L. Wortman. Proceedings National Academy of Sciences, vol. vi.

Compared with the elaborate studies that have been made by Broca, Virchow, and other European scholars, the labors of Americans in the somatological realm of anthropology have been slight. The work before us will, however, go far to redeem the reputation of our own scientists, since it is one of the most exhaustive examinations of a small group of skeletons that has ever appeared.

This group is distinctively American and of a most interesting character, being a collection of some fifty-seven skeletons, together with a large number of fragments of skeletons, constituting the remains of an ancient people that formerly inhabited the valley of the Salado river, a tributary of the Gila, in southwestern Arizona.

The exploration of the valley and exhumation of the remains was conducted at first by Mr. F. H. Cushing aided afterward by Drs. J. L. Wortman and Herman F. C. ten Kate. The bones

were extremely fragile and had to be handled with the greatest care to prevent their crumbling. Not a vestige of hair or of any kind of woven fabric was found with them, and this, together with the fact that the early Spanish explorers make no mention of any cities in this region, argues a great antiquity for the remains. They probably date from a period long anterior to the Spanish conquest, possibly 2,000 years ago.

The excavations show that the people lived in cities quite similar to those inhabited by the Zúñis at the present day; that they had an extensive system of irrigating canals, and that they understood the art of making and decorating pottery. Their priestly rites and orders appear to have been similar to those of existing tribes. Figurines found in the excavations, as well as certain pictographs on neighboring rocks, indicate that they were acquainted with some animal allied to the vicuña, and that they used the *bolas* for capturing it. These suggest affinities with South American Indians.

The skulls belonging to these interesting remains are remarkably brachycephalic, the average cranial index taken from forty-eight of them being 88.47, which is larger than that of any existing race, the Aliuts (86.5) and the Apaches (85.6) being nearest. Most of the skulls are flattened in the occipital region, indicating that the children were strapped upon a rigid board, as is customary with many modern Indians. This has probably increased the brachycephalism to some degree. The same cause probably contributed somewhat to the peculiar dome-shaped character of the skulls, some of them being almost scaphocephalous.

The condition of the skulls was such that in but eight cases could their capacities be measured. These averaged but 1,313cc., being about that of ancient Peruvian skulls, less than that of the existing Indian tribes, and much below modern Europeans. Among existing peoples they rank with Bushmen, Australians, and Andaman Islanders. The sex could not be accurately determined, and it is therefore possible that these were mostly female skulls, which would, of course, be under the average for the race. Dr. Matthews suggests that the capacity of the skulls may depend upon the bodily stature, which was apparently low. Judging from the lengths of the femora reported in Dr. Matthews' tables, and using Rollett's formula for calculating height, the average of these individuals was 1.54 meters, or a

little over five feet. In this respect they were on a par with the Papuans, Malays, and Veddahs of Ceylon, surpassing somewhat the Bushmen and Andaman Islanders.

There are other resemblances between these skulls and those of the ancient Peruvians. The interparietal bone, which is formed by the persistence of the fetal suture between the cartilaginous and membranous portions of the occipital bone, and from its frequent occurrence in Peruvian skulls has been called the "Inca bone," is found with surprising frequency, not less than 18 per cent. of the 88 occipitals examined possessing it. It seems doubtful whether the form called the "apical" bone, in which a separate ossification resembling a Wormian is found at the apex of the occipital, can be correctly considered as an interparietal. The teeth in their tendency to caries and the small proportion of tritubercular second molars show Peruvian characters.

The hyoid bones found are remarkable in the lack of union between the cornua and the body. The matter has already been discussed in this journal. The numerous quotations cited by Dr. Wortman seem to us to prove that the hyoid has been but little studied, and that anatomists, like the rest of mankind, are prone to the ovine habit of jumping the fences of fact in imitation of their comrades. The series of bones cited by Dr. Wortman are insufficient for any well-grounded conclusions. The cornua of the hyoid certainly do often remain ununited late in life, as the writer has often verified. It is necessary to protest against the tacit assumption made by Dr. Wortman in Fig. 42, in which he shows a hyoid of great depth of body and labels it "Anterior and posterior views of negro hyoid." The text shows that this is abnormal, but taken by itself the reader would suppose that the negro hyoid was decidedly ape-like. A considerable experience has convinced the writer that anomalies of a simian character are found quite as frequently in the Caucasian as in the African.

The angle of torsion of the humerus, indicating, according to some anthropologists, the outward twist of the arm necessary for advanced tool-using capacity, was found surprisingly great, being nearly equal to that of modern Europeans. It has been suggested that as this angle increases the inclination between the trochlear surface and the shaft of the humerus necessarily

changes, and it is to be regretted that Dr. Matthews did not tabulate this in each case.

Perforation of the olecranon fossa was found in a great proportion of the bones. This has already been discussed in this journal by Dr. D. S. Lamb. The suggestion that it was due to natural causes, such as the pressure occasioned by grinding corn, is ingenious and plausible, but needs to be confirmed by observations on other peoples who have this habit. The anatomical configurations due to occupation are by no means well understood.

We are greatly impressed with the thoroughness and care with which this investigation has been conducted, and it is greatly to be regretted that the author had not a larger series of skeletons of our indigenous tribes with which comparisons could be made.

While there seems to be considerable foundation for Dr. Brinton's view, expressed in the last number of the *ANTHROPOLOGIST*, that the peculiarities of these bones are due mainly to the habits and food conditions of the people, yet it cannot escape the notice of the thoughtful naturalist that it is by precisely such influences that marked varieties and species of animals are believed to originate. What is an evanescent character today may by inheritance become persistent.

FRANK BAKER.

Eleventh Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution, 1889-'90. By J. W. Powell, Director. Washington, Government Printing Office, 1894. Roy. 8°, xlvii, 553 pp.; pls. and figs.

The Bureau of Ethnology has been zealously endeavoring to fix in distinct record all the accessible evidences of the Indian's work upon this continent before the white man came.

The volume named is among the most important of its issues, containing, in addition to Director Powell's statement of the work of the year, a number of valuable scientific papers upon special lines of investigation.

The first paper, 157 pages, is that of Mrs. Matilda Coxe Stevenson, who has had a rare opportunity and has used it well. She accompanied her husband on explorations in the west, entering heartily into the spirit of his studies, which she has continued since his death. She has been welcomed as a sympathizing friend in the homes of Indian women, and has had a view of

their domestic life which no man could have. The Spaniard with his horse could not crush out the people whose social and ceremonial customs she describes, but before the popular notion that all Indians were roving, without settled homes or agriculture, is overcome the Anglo-Saxon with the steam-engine will have obliterated them. The poor people of the little pueblo of Sia have been reduced to a paltry hundred, but Mrs. Stevenson has caught their story from the old people, and she publishes it while there is yet opportunity to cross-question a few of the personal and material witnesses. The stories in which the animals take on human attributes illustrate the community of mental action in mankind. Esop's fables, Grimm's tales, Uncle Remus, and the Sia animal myths have much of a common quality.

The last statement applies also to kindred stories told by Lucien M. Turner in a hundred pages devoted to ethnology of the Ungava district, Hudson Bay Territory. This paper is the plain story of the life of Indians and Eskimo adjacent to the northern part of Labrador, popularly supposed to be utter desolation. A few hundred of these people maintain themselves in such relative prosperity that the Hudson Bay Fur Company finds it profitable to keep a post among them. The life of Arctic people in the United States is so perverted that it is no longer a promising field for original studies. These Ungava people have been modified somewhat by trading with whites, but the general story of their present lives represents the power they have developed in a severely adverse climate. They are not in such immediate danger of obliteration as the Sia, but Mr. Turner's work will grow more valuable for preservation as changes prevent its duplication.

James Owen Dorsey is well known for his linguistic work, from which his two-hundred-page study of Siouian cults is but a partial variation. This paper is especially devoted to religious beliefs and ceremonials.

All these authors have personal acquaintance with the people they describe and are witnesses of the things they have seen. The bibliographic lists of Messrs. Mallory and Dorsey are important.

The papers are profusely illustrated. In the interest of truth they are ready for the tests of candid criticism, which ought to be prompt that it in turn may be tested before the last witnesses disappear.

JAMES H. BLODGETT.

NOTES AND NEWS

TECUMSEH'S NAME.—As to their origin, the personal names in use among the Shawnee or Shawano Indians are either nick-names, pet names, or totemic names. This class of names is very significative, for by their interpretation may be discovered the totemic clan to which the person bearing the name belongs. The number of Shawnee totem-clans is not very large, but of great interest, through the fact that they are all named after classes of animals, as "round-footed," "hoofed" or "split-footed," "living in the air," "inhabiting the ground," and others. When a man is named "Tight-fitting" or "Good-fit," he is known to be of the clan of the rabbit, for the fur of that animal fits very closely. A woman called "Foaming Water" will be found to belong to the turtle totem-clan, for when the turtle crosses the water bubbles arise around its pathway.

The name of chief Tecumseh (in Shawnee Tekámthi or Tkámthi) is derived from *níla ni tkamáthka*, "I cross the path or way" (of an animate being). By this is meant that the name belongs to a totem of one of the round-footed animals, as that of the raccoon, jaguar, panther, or wildcat, and not to the hoofed ones, as the deer. Tecumseh and his brothers belonged to the *manetúwi msi-pessi* or "miraculous panther" totem; *msi* means great; *peshiwi*, abbreviated *pessi*, cat; both terms combined signify the panther or mountain lion.

Tecumseh's name has been variously translated in former times as "panther-lying-in-wait," "crouching lion," and "shooting-star." All these only paraphrase the meaning, but do not accurately translate or interpret the name. The adjective *manetúwi*, when it qualifies the noun *msi-pessi* as an epithet, points to a miraculous, unaccountable, even transcendental existence, and the whole must be rendered by "celestial lion," which is a meteor or shooting-star. The *manetúwi msi-pessi* lives in water only and is not visible as an animal, but only as a meteor, exceeding in size and brilliancy all the other shooting-stars. It was the totemic emblem of a Shawnee clan, and the members of this clan, to which Tecumseh or Tkámthi belonged, were consequently classed as the descendants of a round- or claw-footed progenitor.

The quick motion of a meteor was evidently likened to that of a lion or wildcat springing upon its prey, and the yellow color of both may have made the comparison more effective. All over America the natives suppose these celestial bodies to be the souls of the dead, and as they travel mainly in a westerly direction they are believed to return to their western abode. In the west lies the Pacific ocean; therefore the tribes west of the Rocky mountains think the souls are returning to that great aquatic world. To all primitive peoples the home of the deceased lies in the west, for there set the celestial bodies which represent souls of departed ones.

A. S. GATSCHET.

TARAHUMARI RUNNERS.—These runners show a remarkable endurance. An Indian has been known to carry a letter from Guazapares to Chihuahua and back again in five days, the distance being nearly eight hundred miles. In some parts where the Tarahumaris serve the Mexicans they are used to run in the wild horses, driving them into the corral. It may take them two or three days to do it, sleeping at night and living on a little pinole. They bring in the horses thoroughly exhausted, while they themselves are still fresh. They will outrun any horse if you give them time enough. They will pursue deer in the snow or with dogs in the rain for days and days, until at last the animal is cornered and shot with arrows or falls an easy prey from sheer exhaustion, its hoofs dropping off.—*Tarahumari Life and Customs*, by Dr. Carl Lumholtz, in the September Scribner.

THE PALÆONTOGRAPHICAL SOCIETY OF AUSTRALASIA has just been organized "to collect, illustrate, and place on record examples of all systems of old-time written characters, whether in the form of pictograms, symbolisms, or phonograms, as also representations of the various mnemonic aids to memory used by so many savage and barbarous peoples." Its work will embrace all countries and all known systems of written language. The coöperation of ethnological and archeological institutions throughout the world is invited. Dr. A. Carroll, Kogarah, Sydney, N. S. W., or Mr. Elsdon Bert, Wellington, New Zealand, will furnish all information.

F. W. HODGE.

ETHNOGRAPHY OF THE ARAN ISLANDS.—Professor N. C. Had-don and Dr. C. R. Browne, of Dublin, have recently prepared for the Royal Irish Academy an exhaustive study of the Aran islands, intended as the first of a series of studies in Irish ethnography. These islands, which lie in the mouth of Galway bay, about twenty-eight miles west of Galway harbor, are three barren masses of limestone rock, thickly strewn with large, ice-worn, erratic bowlders of granite and sandstone from Connemara. The total population is nearly 3,000. The inhabitants of an island do not marry outside of it; consequently little new blood is introduced, and there is considerable facial resemblance among the natives. They are well made, of good stature, with gray or blue eyes, and usually dark-brown hair. The general facial type has been described as an exaggeration of the Gaelic. The authors made a large number of anthropometric measurements, which are given, together with typical photographs. The data thus collected lead them to dissent from the opinion that the Aranites are descendants of the Firbolgs, a small, swarthy, dark-haired people, held to be of Thracian origin. The chief antiquities of the islands are well known pre-Christian duns or forts. Cloghans or beehive stone huts are common. Primitive customs and beliefs abound. The skin of the seal is used as a preventive against gout and colic. The belief in the evil eye is almost universal. Stone anchors are still in use and querns have been employed until quite recently.—*Geog. Jour., Lond., 1894, p. 59.*

MORTUARY CUSTOMS IN NEW HEBRIDES.—In Malekula a sort of mummy is made, of which specimens were brought to the ship at Port Sandwich by a white trader, who had procured them in exchange for a rifle at the conclusion of a "sing-sing" in the neighborhood. They are said to be the effigies of the chief whose skull (the only portion retained of all his remains) forms the head. This is plastered with mud, to represent a living face, and a body of bamboo, twigs, and mud, highly colored in black, white, red, and purple stripes, forms the figure. All "mummies" seem to be decorated with a similar design, and it is possible that they represent the body as laid out for burial. A small one—perhaps personating a baby—has its head founded on a

small cocoanut, and others have no body, but only a stick thrust into the hole through which the spinal cord passes. On each shoulder is moulded a highly conventional face, looking to right and left respectively, and in each hand is a pig's lower jaw with tushes. Smaller, highly conventional heads on sticks, with feathers stuck in where the ears should be, and ornamented with pigs' tushes, were also brought to us by the same trader, the "tambu" having been removed off them. We were given to understand that they were held in the hand while dancing.—*Somerville, in Jour. Anthropol. Inst. G. B. and Ird., xxiii, p. 392, 1894.*

POISONED ARROWS OF THE AKAS.—The Akas are one of the so-called Lohitic tribes of the Asam valley, occupying independent hill territory to the north of the Brahmaputra. They poison their arrows for warfare as well as for large game, and such arrows proved deadly to most of the Sepoys wounded by them in the expedition sent against the tribe some years ago. Several of the arrows were sent to me for examination while I was acting professor of chemistry at Calcutta some years ago. From its physiological effects the poison was evidently aconite, and the roots from which the poison was alleged to have been derived undoubtedly belonged to a species of *Aconitum*. The arrow-heads are mostly made of bamboo, but a few are of iron. The shafts are usually of bamboo. Some of the heads are made up of pieces dovetailed and tied together with cane in such a way that dragging on the arrow when it has reached its quarry only pulls out the stem, and the barbs separate more deeply into the wound. The surface of the heads are scored so as to form valvular crevices for the poisonous extract which is smeared over them.—*Waddell in Journal of the Anthropological Institute, London, August, 1894, p. 57.*

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SIMILARITIES IN CULTURE

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The subject of my address is "Similarities in Culture," at the present time an important and perplexing question in ethnology. Let me state what is commonly meant by similarities in culture.

Among peoples far removed from one another geographically and often belonging to different types of mankind there are found words, art products, industries, social structures and customs, folk-tales, beliefs and divinities, and even literatures apparently so much alike as to raise the following questions in different minds:

First Theory.—Are peoples identical or akin when their activities and productions are alike; or can it be said that these likenesses were derived from common ancestors? In the case of the Aryan languages you will say yes. But may one employ this notion or concept of kinship and ancestry to account for likeness in custom, industry, fine art, government or myth, or in languages generally? Can the premise be laid down that, when two peoples are alike in their industries, customs, and laws they are connected by blood or at least by nationality? To state the problem a little differently, to what extent must two distant peoples resemble each other in the characteristics just named in order to make it certain that they are near akin? Nothing is more common than assertions by professed archeologists, ethnologists, historians, and especially by linguists, that peoples are

* Address of the retiring President before the Anthropological Society of Washington, February 4, 1895.

the same because certain presumed similarities are alleged to exist between them. Later on it will be necessary to examine this theory to ascertain what standing it may have in the study of culture. It is sufficient here to state the propositions that many peoples have been declared to be the same by reason of language or activity, and that when peoples are akin their speech and acts will be alike.

Second Theory.—Or can it be that the occurrence of the same processes or productions among peoples widely separated may have been derived from contact or common teachers? There are a multitude of ways in which this might happen. You know that before there was a beast of burden humanity had found its way over the earth on foot, and that in the simplest craft, without compass and with only Nature's pilots, every water had been traversed and every habitable island in all the seas had been discovered and settled. It is a long journey from the supposed cradle land of our species to Tierra del Fuego; but it had been successfully accomplished in prehistoric times.

Similar devices find their way about the world nowadays, and this has been true so far back as records exist:

a. By commerce, trading from hand to hand, the authors or manufacturers remaining at home. Innumerable examples of this are forthcoming and long distances have been passed over by objects. In their new abode they have quickened the minds of inventive geniuses and started new wants and series of devices in the native industrial life. The practical museum curator will readily recognize this class of similarities. I myself have seen cocoanuts and Chinese coins in Alaska, Eskimo fish-hooks in Hawaii, and Venetian beads from every corner of the world.

b. Itinerants and peddlers and tramps have marched about the world ever, and men and women have been enslaved and wrecked. These have transported things and ideas and words. They have set up a kind of internationalism from place to place. We read often that these middle men and women had, even among savages, intertribal amnesty. This kind of aboriginal pedagogy has been found in active operation among savage tribes in historic times. It is a fair question, then, how far backward in time this globe-tramping extended and what influences the wanderers exerted.

Bandelier * says :

Although languages and dialects were separated from one another by uninhabited regions, prisoners of war could tell of what was going on at their homes ; the booty would include a variety of strange objects ; and traders traversed the country in the face of numerous dangers, visited the enemy's markets, and carried goods to them, with many novelties. This process was repeated from tribe to tribe ; and in that way the products of one half of the continent passed, often in single objects, to the other half, and with them accounts of far-off regions, though changed and distorted by time and distance, into remote quarters.

c. Migratory bands and whole colonies have ever been on the the go. A distinguished ethnologist has said that "early man was scattered over all the earth in kinship tribes, each one knit together by bonds of kindred blood and cords of marriage ties."† This being true when the facilities of locomotion were rudest, the movements have grown more vigorous as the appliances were made better, until the idea of universal dominion was conceived. Peschel says that "all peoples were capable of accomplishing the migrations which we have ascribed to them. The difficulty generally exists only in the imagination of the spoilt children of civilization."‡

Third Theory.—The last theory to be noted here is this : Can it be argued that like activities may spring from a common humanity, in similar environments and culture stages, under similar wants and stress ? This takes for granted the monogenist's doctrine that the inhabitants of the earth were originally of one blood. There is no doubt of the profound effects and influences of the earth, the waters, and the air upon mankind. They produce all that is natural in man, and they provoke and suggest also a large measure of his artificial or progressive life. §

Three Schools.—Now, to remove all mystery and to make the question as perspicuous as possible, there seem to be three somewhat opposing schools of belief regarding the origin of culture similarities. They may be called :

* A. F. Bandelier: *The Gilded Man*, N. Y., 1893, p. 7.

† Powell: *Science*, N. Y., 1895, n. s., i, p. 16.

‡ *Races of Man*, N. Y., 1876, p. 31.

§ Consult Franz Heger, *Mittheil. Anthropol. Gesellsch.*, Wien, xx iii, May 3, 1893: *Hat die von einander unabhängige Erfindung gleicher oder ähnlicher Geräthe und, wenn wir die Frage auf das geistige Gebiet ausdehnen, das Vorkommen gleicher Ideen und Vorstellungen, auch einen Grund in der Rasseneinheit oder nicht?* Also Brackenridge, *Louisiana*, 1814, p. 189.

1. The ethnographic school.
2. The accultural school.
3. The anthropologic school.

At any rate, whether we employ connotive names or not, the first holds that similarities argue identity of peoples or blood; the second contends that like industries arise by reason of the same teachers; a third believes that similarities spring from the species, the want, the environs, and the nature of things and of mind.

How Similarities are Effected.—In the presence of confusing theories it would be most satisfactory if one or more undisputed propositions could be found in this connection. The following will probably meet with universal assent:

1. Similarities are in our day known to be effected by the same person, tool, or workshop.*
2. Others are surely produced through hereditary and traditional teaching.
3. Some come by borrowing, lending, slavery, and conquest.
4. They get about the world by barter and commerce.
5. They arise through like psychical and physical attributes of race or species.
6. They spring from similar attributes of environment acting on different races and on the homogeneous qualities of human nature.†
7. Startling similarities occur accidentally, as the Greek potamos and the Algonkian Potomac.

*There are in Japan typical localities, schools, and families wherein pottery of such peculiar paste, form, decoration, etc., is so marked that Professor Morse can distinguish them not only from all other examples in the world beside, but by name from one another. If he were to see a piece of any of these types in the remotest corner of the earth he would not say that any people similarly environed would make precisely the same things. He would say, "How did this Bairin or Odo, or what-not, get here."

†Major Powell says of the scattered first men: "There can be but one kind of mind. Two and two are four with every people; the moon is round, gibbous or crescent wherever it shines for man; the sun shines in every eye; the child grows in every experience. Thus the four great mental activities of number, form, cause, and becoming are the same in every land, and the mind of every man is a unity of these four powers, and every mind is like every other mind in their possession. They differ only in extent of experience acquired directly by self or indirectly from others. While the mind is the same with all men the will is the same. All desire to gain good and to avoid evil, so all wills develop on a common plan. By mind and will, by mentality and volition, man progresses on the five highways of life, so that all men are impelled to the same goal of wisdom. Pursuit of the common end has proved to be more powerful in producing involution than the forces of environment in producing differentiation or classic evolution."—*Science*, N. Y., 1895, n. s., i, p. 17. Also McCulloh, *Res. on America*, Balt., 1817, p. 188, quoting Gibbon, *Decline*, etc.

8. Finally, there are like results that spring from opposite causes or occasions, as the building of a subterraneous house in one region to dispel the heat, in another to keep out the cold.

Every one of these propositions is true under certain conditions; they are true each under its own conditions, and that leads to the next argument.

Species of Similarities.—In point of fact, then, there are different grades, classes, species of similarities in human culture. A Moki rabbit club is like an Australian boomerang and an Egyptian throwing club in a limited number of respects, but coins from the same issue and die are alike in a greater number and in different degrees of respects. Some similarities therefore are to be accredited to one series of causes, others to a different series, all having unlike significance.

Supposing it could be shown that there are distinct varieties of similarities, as well as distinct ways of accounting for them, then, when one has diagnosed his specimens correctly (and that is always his scientific duty), he may predicate the true theory of their production. Those similarities that belong to the first class and are effected by the same arrow-maker, potter, painter, architect, die, inventor, or author are certainly more near to identity and are more profound than those produced by—

1. Different men or factories, even in the same group or community.
2. Different communities of the self-same family of peoples.
3. Different stocks or families of the same race.
4. Different historic periods of the same people.
5. Different environments or geographic areas or sources of supply.
6. The human species in comparison with natural forces or other living species.

Or, fixing the attention on two peoples under consideration, the question of similarity between them might run a gamut like the following:

1. Casual resemblance in one or more respects.
2. Similarity in one object or custom.
3. Similarity in one process or activity.
4. Similarity in several activities.
5. Similarity in many industries.
6. Similarity in language.

7. Similarity in social structure.
8. Similarity in beliefs or religion.
9. Similarity in practically all respects.
10. Identities.

Definition of the Term "Similarity."—It is absolutely essential that the technographer, the artist, the linguist, the sociologist, the mythologist, each and all lay down a comprehensive and clear definition of the term "similarity in culture" that will enable one to use it advisedly. I imagine they would speak somewhat as follows:

1. All devices of man involve the question of natural material, resources, units and elements out of which they are effected, "*ex qua aliquid fit.*"

2. Involve differences in the formal cause, the motif or mental substratum of the action or thing, the patterns in the mind of the agent, "*per quam aliquid fit.*"

3. All inventions are produced by their own efficient causes, "*a qua aliquid fit.*" This would comprehend all the tools, natural forces, metrics, mechanical powers and engineering involved, together with their processes, artificialities, and order of working.

4. All devices of man involve the question of functioning or differences in the final cause, "*propter quam aliquid fit.*" In the inventions of mankind every one is both an end in itself and a means to a multitude of other ends. This topic therefore includes everything that an invention is and may become. These are the categories of Aristotle involved in all that men do. Perfect agreement in all of them is perfect similarity, partial agreement is partial similarity and may exist in a variety of degrees.

Or perhaps it would be more in accordance with modern thinking to adopt the phraseology of the naturalist. He first investigates the perceptible attributes, the structures, and the functions of the adult organism by means of the most refined instruments; he studies the biography of each individual from germ to decay; and, lastly, he attempts to find out how his species stands related to other species. In arranging these he endeavors to read the mind of nature, substituting homological agreements for analogical agreements. In point of fact both analogies and homologies are constantly held in mind.

The ethnologist is bound to apply rigidly this natural-history

method to the study of human activities. He must scrutinize carefully the material and the structure of two industrial achievements, of two esthetic productions, of two languages, of two social systems, of two religions, to ascertain how they are composed. In biological phrase, he must examine the structure and ontogeny of each specimen with a view to determine the question of philogeny between them. This gives ample scope to separate one kind of similarity from another and to tabulate the result in columns of likenesses and differences.

Finally, besides the Aristotelian and natural-history methods of discrimination, there are, associated with all of man's activities, by-ways, by-fashions, tricks of the trade, and trade-marks non-essential to structure or function, and there are folk-fashions around every industry that help to brand its author's identity upon it. The coöperation of all these cannot exist in areas wide apart. When two phenomena or objects agree in all these respects they came from the same shop or the same author. The source is identical. There is no mistake about it, even though examples may be found in several parts of the world.

Axioms.—From the particular propositions and from characteristics of similarities, just explained, the following axioms may be stated :

1. In ethnology, the more that the same arts, languages, institutions, and opinions are alike structurally and functionally or in accordance with the Aristotelian categories, the stronger is the evidence of their common origin. The more they are unlike in two areas, the stronger is the evidence of independent origin.

2. If the same invention occurs in three or more places, that is stronger evidence of a common human origin, and the multiplication of places strengthens the argument for oneness of cause.

3. Again, the multiplication of respects in similarities between any two peoples is another strengthening of evidence that they were once one, or that they have both been infected with the same contagion of culture. It is the same here as in law, the greater the number of witnesses that give to the same transaction testimony in the identical language, the surer is the court of collusion.

4. While it is true that inventions may be so similar in structure and appearance that there can be no doubt of their having come from the same source, the converse of the proposition can

have no standing. It can never be said that any degree or kind of similarity between inventions will prove their independent origin. There is no mark of independent origin through similar stress or environment. Indeed, always the less similar things are, the greater is the probability that their originators had no connection.

5. If two anthropological phenomena in different parts of the world are homologous, that is no evidence of their independent origin. To the normally constituted mind it raises the suspicion of contact after some fashion. The contact may be impossible of proof historically; but the belief that complex structures with identical functions and widely separated in space arose independently is the last resort. It is never illogical to hypothecate some sort of contact or tuition; but the difficulty of supposing independent origins increases every moment with the greater and greater likeness in the intimate structure.

6. You can never be sure of two common resemblances, even that they arose independently, for everything that can be accounted for by the common-nature theory could also have been taught. What might possibly be accounted for by common race or family could frequently have been accultured. Indeed, a sporadic resemblance between peoples living widely apart in corresponding environments immediately raises the question why is this the only art in which they resemble. That the profundity and immediateness of relationship between peoples will be gauged by the intimate structural likenesses in their productions ethnology and biology agree. Two identical species do not arise independently.

7. It will be admitted that varietal dissimilarities in similar types of invention evidence independent origin of some kind; and the more marked these varietal differences are, the farther apart may be their origins. In such cases the similarity is not the proof of independent origin. That proof must be sought elsewhere, perhaps historically. It is the style and degree of differences that declare the degree of independence. Things of the same type may differ and yet may have been made by the same man or in the same tribe. But differences in such cases are not the same as those that occur independently. Varieties may be generically alike in spite of independence, but they cannot be alike by reason of independence.

The Independent Origin Theory.—Let us study a little more closely the independent origin theory, which is now very popular. There are activities which all human beings practice in common whenever the occasions and the facilities arise, certain laws to which all are subject, certain endowments which are the heirloom of the species. The enumeration of these one by one would eliminate the common actions and culture similarities arising from a common human nature and leave the inquirer only such as have arisen by inheritance or acculturation.

1. *Man a Part of Nature.*—No one doubts for a moment that all human beings with their achievements are terrestrial objects and phenomena, subject always and everywhere, without regard to race or time, to the Keplerian laws, to physical forces, to chemical actions and reactions, to osmotic processes like the plant, to nervous stimuli and muscular movements like all other vertebrates. They all have five fingers on each hand and five toes on each foot, etc. Just so far as humanity is in the great streams of existence with other beings under the same canopy of heaven, dwelling in the midst of the atmosphere, the hydrosphere, and the geosphere, where similar causes bring about similar results, no one will call the proposition in question that all sorts of people in every part of the world will act similarly under like provocations.

2. *Mankind as of One Species.*—Before the human species began to separate at all its members must not only have been endowed with traits of mind and body in common, but already must have been schooled in many common experiences. These are the heritage of humanity, the mother arts, language, institutions, and beliefs, of which all others are the progeny. If, then, you find all mankind adapting house and clothing and occupations to the environment in a general way, it is what they ever did; but, inasmuch as there are always several ways of getting at the same complicated result, this proposition is true only generically and in forms little differentiated from nature.

Brinton * says:

It seems to me, indeed, that any one who will patiently study the parallelisms of growth in the arts and sciences, in poetry and objects of utility, throughout the various races of men, cannot doubt of their psychical identity. Still more, if he will acquaint himself with the modern science of

* *Races and Peoples*, N. Y., 1890, p. 82.

Folk-lore, and will note how the very same tales, customs, proverbs, superstitions, games, habits, and so on, recurs spontaneously in tribes severed by thousands of leagues, he will not think it possible that creatures so wholly identical could have been produced by independent lines of evolution.

3. *The Same Animal Teachers*.—Not only mankind, but animals associated with man or living in his presence have generic and family resemblance in conduct and adaptabilities to human wants in various parts of the world. Different peoples have been instructed by these creatures in housebuilding and arts, in speech and society, and different species have surrendered the various parts of their bodies and their productions for the supply of human needs. When two widely separated peoples use shells for spoons, gourds for vessels, or give like names to the whippoorwill, it is not necessary to suppose contact, if they agree only in these particulars and do not use precisely the same device in each case.

4. *Plant and Mineral Friends*.—After the same fashion there are obtrusively useful plants common to many geographical provinces, with prominent parts—fruit, qualities, and substances for man's comfort. The savage could not fail to take note of them, and their attributes sufficiently account for their employment.

The same is true of stone; for early man's industries the world had but three kinds: stone for chipping, stone for battering and grinding, and stone for cutting. Perhaps all three arts are a common and continuous heritage. At any rate, stone is so refractory and circumscribed that we do not have to suppose the importation of teachers to impart processes that Nature herself constantly taught.

5. *Areas of Characterization*.—The various races, peoples, and breeds of mankind have been endowed with characteristics peculiar to them by reason of environmental causes; but they have at the same time perpetuated the generic spirit that makes all races akin.

The new and plastic race spirit has had to go in predetermined tracks, by reason of the uniform number of wants, the restrictions upon human endeavor, and the attributes or endowments of culture-areas; so that, while differences are really the legitimate product of separate culture-areas, general similarities may survive in them. Similarities in separated culture-areas are not

profound and the likeness between human productions begotten therein is no greater than that of the regions.

6. *Varietal and Race Differences.*—These different races must under other stress learn also new arts, since an activity may be so congenial to a new region or material that the laws of mind and of least resistance would constrain all comers there or users thereof to walk in the same paths by a species of natural acculturation. Notice the reindeer, dog, and birch-bark occupations in hyperborean regions, buffalo industries on the Missouri, pueblo and pottery industries in the southwest, bamboo industries in Malaysia, and so on. In each of these places there are several families of mankind, and you will find them building, clothing, working somewhat alike, pursuing the same pleasures, and gazing on the same spirit world. Leaving out the fact of acculturation and intermarriage, even here Dr. Matthews, Mr. Cushing, or Dr. Fewkes would have no trouble in discriminating peoples.

Just as the limbs of trees separate from a common trunk, and each of these limbs gives rise to a set of branches, and each branch is the starting point of twigs, which produce the spray, the whole process representing a very long time, so the human species has given rise to subdivisions. This is the common way of representing the affiliations of living beings; but in the case of man, as of animals and plants, the limbs are not alike in variety; neither are any of the other subdivisions. They stand for new centers of variation.

There are three leading types of mankind—the Caucasian, the Negroid, and the Mongoloid. If certain proclivities and ways are the common inheritance of the human species by reason of common blood, then there must have been superadded upon the three types proclivities and ways and arrests by reason of the causes which made these three to differ.

Again, there are about twelve well-defined races of men. You will find them enumerated in Müller, Peschel, Haeckel, Huxley, Topinard, Keane, Brinton, and elsewhere. By the same processes that made them distinct races, proclivities and ways were engendered in each one of them that were *sui generis*.

Finally, there are several hundreds of families or stocks of mankind, speaking absolutely different languages, so far as the philologist is able to discriminate. By reason of the isolations and environmental pressures that made these to differ in appear-

ance and speech, they acquired finer proclivities and ways of doing things that one would discover to be their own if he were well enough informed. There are plainly before the eyes of all who will observe, in spite of a common humanity, well-marked kinship groups, territorial groups, national groups, technic groups, psychological groups.

Again, from the earliest times the separation of the limbs from the trunk of humanity has been coördinated with the interlacing of the leaves and spray. So the peoples of the earth have intermarried, traded, taught one another, lent, borrowed, and improved upon each other's activities. To this general transfer Powell gives the name of acculturation.

The True Question.—In point of fact, the question of a common humanity is not exactly whether inventions arose independently by reason of a common human mind, but how many generations, varieties, or races back in time one is to look for the first appearance of the common want and culture status out of which the particular invention in question sprung. Omitting a few fortuitous examples, all resemblances in culture are derived from that specialized nature which is so far removed, both spiritually and biologically, from that of any other creature. The question, after all, is like that of a genealogical register. In fact, working perpetually within the grooves, tracks, currents, leading strings of environment, there are generations of similarities based on:

1. The specific attributes of humanity as a whole.
2. Varietal or racial attributes of peoples.
3. Industrial association or acculturation.
4. Common craft or union in activity.
5. The genius and tradition of family or school.
6. The unique spirit of one man.

The Dividing Line.—Now we come to the dividing line between the anthropological similarity and the ethnological similarity and acculturation. After allowing to the notion all that can possibly be expected by reason of the earth's forces and resources (and they are very potent), by reason of common human nature and traits ("a great and noble fact"), of natural pedagogy, of corresponding culture-areas, and even by reason of long-time-ago ancestors, there still remain the whole immense body of characteristics in human achievement that belong to forces and materials that do not often come together

independently, but are designedly brought together. The concomitancy of so many identical movements, according to the doctrine of chances, more than once is not to be expected.

It is agreed, then, by all that certain kinds of similarity may exist in regions wide apart independently when the occasion arises and the environment permits. It is also admitted that things may be so similar as to allow no doubt that they were created under the inspiration of the same teachers. There is, ⁷ then, a criterion, a boundary line, not definitely fixed, perhaps, but a fence between those so-called similarities that arise independently and those which show acculturation of some kind. This fence must be largely psychological. ¹

The question, I repeat, is not one of origins at all, but one of the number, kinds, and degrees of similarities in the artificialities of life. For example, the invention of the canoe is a natural, human process; the bark canoe is environmental, the birch-bark canoe is culture-historical. But what should we say of the Amur and the Columbia River types, each pointed beneath the water like a monitor and unlike any other species? Surely these must have some kind of acculturation. Now, if it be found that the Columbia stock and the Amur people have also the same name for their pointed canoes and a multitude of other coördinated likenesses, then kinship of blood or nationality is proclaimed.

There must have been very careless use made of these plain declarations, and the philologist has been the chief of sinners. Dr. Brinton, at the Anthropological Congress in Chicago, said, with reference to the relation between the peoples of America and those of the Eastern Hemisphere, "that up to the present time there has not been shown a single dialect, not an art nor an institution, not a myth or religious rite, not a domesticated plant or animal, not a tool, weapon, game or symbol, in use in America at the time of the discovery, which had been previously imported from Asia, or from any other continent of the Old World."*

This is a startling sentence after the thousands of pages that have been written based upon assumptions that the similarities therein denied do exist in sufficient number and intimacy of structure to proclaim identity of the Americans with numerous Asiatic peoples.

* Internat. Cong. Anthropol., Chicago, 1894, 151.

If you will carefully read Dr. Brinton's paragraph, however, you will observe that the distinguished ethnologist probed the heart of the matter in a single paragraph. He is speaking of dissimilarities or similarities falsely so called. He means to say that so far as the genuine evidence goes the men of the two hemispheres are so different in themselves as well as in their activities that there is no good evidence of common origin or culture. The independence is proclaimed on the score of unlikeness.

The rationale of this assertion is undisputed. When any two peoples, or arts, or industries, or institutions, or languages are scientifically dissimilar, then contact is so far forth disproved.

If I should hesitate to indorse Dr. Brinton's paragraph fully, it would not be in its condemnation of those who, like Publius Considius, had claimed to see and hear what they had not seen and heard, but in ascribing too much originality to the Americans. To me the whole activital life of the Western Hemisphere looks second-hand. But ethnological literature is the graveyard of hasty generalizations. Great fault surely is with those who on slight coincidences of sound or arts or social phenomena have declared the identity of peoples not even belonging to the same subspecies of the human genus, and have assumed acculturation between races with half the circumference of the globe between them because of slight resemblances.

The old-time travelers and ethnologists, being uninstructed as to our modern studies concerning man, themselves erred in mistaking superficial resemblances and mimeries for essential and fundamental similarities. They did not err in thinking that like inventions spring from related peoples, but they were not called upon to discriminate the true nature of likeness. But it is not my intention to abuse those who have given me so much pleasure and a deal of solid instruction.

We are indebted to these older students for many extremely precious books written to prove that this people were the same as that. The theory was wrong, but the works are crowded with information upon a thousand subjects of abiding interest. If we take issue with the authors, it is merely in the interest of science and with no wish to disparage them. Of the older writers I shall not now even speak. They walked by the light

they had, and there are excellent modern examples to illustrate the point.

The question that confronts us everywhere is at bottom one of the character of testimony, of the competency and credibility of witnesses, and of the use that is made of testimony. We are not ready yet to decide between anthropologic, ethnologic, and accultural similarities, but are arrested between folk-lore and science, between truth and falsehood. At the very outset of every one of the sciences students were confronted with folk-collections, folk-observations, folk explorations and researches, folk-tales, erroneous data, prejudiced and poetical statements.

It is a melancholy admission, and I think every one of my brother curators will bear me out in it, that only a very small per cent. of the specimens in the anthropologic and ethnologic collections of the world are trustworthy witnesses in a refined study.* Let a trained Americanist go carefully through the cabinets of the world or examine what is inscribed on the backs of hoarded manuscripts. The Wilkes collection in the National Museum was received from the United States Patent Office and is of great value; but one would lose his reputation for scientific accuracy who would base any conclusion upon it as it was originally labeled. The same is true of the assertions of amateur travelers and of their collections and photographs. Too frequently attempts are made to commit these extremely interesting and popular accounts to an accuracy not attempted by the author. In no invidious sense, most of such writing is folk-lore and so designed to be, and delights the folk element in us or it would have no audience.

The very essence of science is comparison. The remedy for superficial work is not in the abandonment of research, but in its prosecution according to better methods.

If I may be allowed a suggestion, I should appeal to my colleagues in this and other societies to have a tacit understanding to use with great caution what is contained in ordinary books of travels and passing articles in popular journals whenever they cannot be made to conform to the laws of historic science or the laws of ethnologic science. If the statements may not be substantiated by accessible testimony or actual specimens or photo-

*See R. Andree, *Brasilianische Ankeraxt*, etc., Brunschwg., lxxv, 17.

graph, it does not seem fair to the writer to put him upon his veracity beyond his own designs.*

The British Notes and Queries, the French, German, and Austrian directions to collectors and observers, especially the continued series of pamphlets of instruction sent out by the Smithsonian Institution and the Bureau of Ethnology, are entirely in the right direction. It only remains for the bodies issuing these circulars to call their agents to account and to put upon them the obligations of the naturalist, who is compelled to accompany every statement with tangible or documentary proof. I shall also hail the auspicious day when by illustrated publication all museums shall be practically turned into one museum, by which means one-half our errors will eliminate themselves.

When men go out hunting similarities they usually find them, or, at least, the personal equation of the best of us interferes with that rigid scrutiny without which all our professed science is child's play.

On the other hand, when men lay down the dictum that all widely separated similarities are due to a common humanity, and that is the end of it, they substitute dogmatism for science, and this has shrouded every mind or people in midnight ignorance that has been so unfortunate as to be subjected to it.

I deem it of the utmost importance to open all questions of this kind to more careful and renewed scrutiny, to apply the principles of counted and graded similarities, to leave the evidence in some convenient center for the inspection of the most critical, to combine the technographic with the ethnographic arrangement in study, and finally to draw no conclusion that is not in conformity with the procedure of natural history. Above all, the best results will come from organized coöperation by skilled students combined in a perpetuated or endowed research.

Let us hear the conclusion of the matter. Similarities in culture do arise:

1. Through a common humanity, a common stress, common environment, and common attributes of nature.

*"To study culture is to trace the history of its development, as well as the qualities of the people among whom it flourishes. In doing this it is not sufficient to deal with generalities, as, for example, to ascertain that one people employ bark canoes, whilst another use rafts. It is necessary to consider the details of construction, because it is by means of these details that we are sometimes able to determine whether the idea has been of home growth or derived from without." (Lane Fox: *J. Anthropol. Inst.*, Lond., 1875, vol. iv, p. 400.)

2. Through acculturation—that is, contact, commerce, borrowing, appropriating, between peoples in all degrees of kinship.

3. Through common kinship, race, or nationality.

Generic similarities arise by the first cause; special and adventitious similarities by the second cause; the more profound, coördinated, real, and numerous similarities by the third cause.

Similarities are partly natural, such as sounds of animals, forms of pebbles, qualities of stone, clay, and the like, but most of them are fundamentally ideal. Where the same idea exists in two areas, a simple one may have come to men independently. One containing two or more elements in the same relations and order is less likely to have so arisen, while a highly organized idea could not often have come to two men far removed from each other. Furthermore, a complex idea is never the progeny of a single mind, and that embarrasses the question further.

The elements of similarity that appear independently are in new functions for old structures, the qualities of materials, the forms of vegetal life, the actions and voices of nature, in what we may call the working part or foundation of the invention.

The elements of similarity that arise by acculturation are fortuitous partly, and generally stand out as radically new. On examining the culture of the borrower and of the lender, the difference of race or people is apparent.

The elements of similarity that arise from identity of race or blood are homogeneous, multiplied, ideal. They exist not so much in the working and natural as in the inventional and artificial part of the activity.

The generic and adventitious similarities are most striking and most frequently called to notice. The error is in taking them for profound and real similarities. Those similarities that are imbedded in the life of peoples and logically coördinated with the annual circle of activities are of the family or stock and beyond any reasonable doubt proclaim the people to be one. Furthermore, they exist for the trained and patient eye and hand; they elude the gaze of the superficial observer. The identification of them is the reward of long years of patient research and the finder is the discoverer of a pearl of great price.

A COMPARISON OF SIA AND TUSAYAN SNAKE CEREMONIALS

BY J. WALTER FEWKES

Ever since I began my studies of the mythology and ritual of the Pueblo Indians of our Southwest, in 1890, I have looked forward to a time when sufficient data should be accumulated by ethnologists from all the pueblos to allow one to enter upon a second stage of research—the comparative study of Pueblo ceremonialology. The dictum that what is true of one pueblo is true of all, while seemingly probable, could only be accepted in a general sense, and it appeared to me that one great requisite to interpret this complicated subject was a careful record of the ceremonies in the different pueblos. When a body of data of this kind exists a comparison, in which whatever is local might be eliminated and the essentials brought out in clear outlines, is possible, and would afford a reliable picture of the aboriginal culture which distinguishes the Pueblo peoples. Although recognizing this comparative method to be all important, I have confined myself to the less fascinating accumulation of details of Tusayan practices, awaiting investigations of the other pueblos.

The account of the Sia ritual lately published by the Bureau of Ethnology,* while not all that I had wished, makes it possible to begin that comparative study which promises to be so pregnant in results. The best known of all Pueblo rites at present is the Tusayan snake dance.† The Sia memoir describes similar rites in that pueblo, which belongs to the Keresan stock. In the present article I have therefore ventured to undertake a comparison of the two, from which it seems that in essentials the Snake dance is the same in two widely separated pueblos generally ascribed to two different linguistic stocks.

The material which I have used for information concerning the Sia ceremonial is drawn from pages 76–91, supplemented by scattered references throughout the work. Of this material I suppose that the descriptions of the first part of the rain ceremony

*The Sia, by Matilda Coxe Stevenson, Eleventh Annual Report of the Bureau of Ethnology.

†The Snake Ceremonials at Walpi: Journ. Amer. Eth. and Arch., vol. iv.

of the Snake society (pp. 76-86) were from personal observations; the remainder (pp. 86-91) were "given the writer by the vicar of the Snake society." More detailed and personal observations would aid us very much in the comparisons.

It will be noticed in comparisons of the Sia and Tusayan rites that there are many differences in the two, as might be expected, but the object of this article is to show that in essential points they are the same. Throwing out of consideration the dying out of the ceremonials and celebrants, it may be well, on the very threshold of the subject, to examine a cause which *a priori* would be likely to affect the ritual in Sia and Walpi somewhat differently. While the Pueblo peoples of our Southwest have always been very conservative in religious practices, they have not altogether resisted the influences of the Aryan peoples with whom they have come in contact. A modification, small though it often is, has been more marked the more intimate the contact, so that many changes in mode of life directly traceable to white influence can be found today, especially in those pueblos near the railroad or along the Rio Grande. Firearms, fabrics of eastern manufacture, wagons, household utensils, windows of glass, and many other objects are now in daily use, and no better place to study how many things of white man's manufacture the Indian needs can be chosen than any one of the prosperous trader's shops resorted to by the inhabitants of the eastern pueblos.

In those most conservative of all customs, religious faiths and practices, the Rio Grande Pueblos have been considerably influenced, and in some instances, although still observing ancestral ceremonials and holding aboriginal beliefs, they are nominally Catholics. In other cases this modification has gone still further and the zeal of the devoted fathers of the church, who for three hundred years have labored among them, has introduced an element in their religious lives which has had a more profound influence. Much of their ritual is still aboriginal, and their ancient beliefs have a tenacious hold on their hearts, but no one can deny that Christianity is today a well-grounded and accepted faith among them. Many survivals of ancient belief and practice, varying in quantity in different pueblos, still exist, and there may still remain a strong belief in the old as opposed to the new; but this fact is evident, Christianity has exerted a great influence on most of the eastern pueblos and this belief has

profoundly modified the religious life of the majority of the people.

As we leave the Rio Grande pueblos and pass westward or withdraw from the railroad, the amount of this influence diminishes. From pueblos in which there is a mission and regular priest we pass to Zúñi, where neither exists. There are the walls of a mission in ruins, with roof fallen in and (in 1890) with floor littered with decaying skeletons or putrefying carcasses of dogs. The bell, however (1890), hangs in place, and is said to be rung once a year, at the Fiesta de los Muertos,* and portions of the altar reredos are still visible.

In front of the ruin is a cemetery, in the midst of which rises a wooden cross, which tells its story of the former influences of the zealous padres. No Christian service has been held in the Zúñi mission for years, yet the people bury their dead in the churchyard and celebrate a feast of the dead.

One step nearer the native religion of the Pueblos and we visit Tusayan, the least modified of all these people, both in secular and religious things. Among the Tusayan we find no church, no consecrated burial ground, no Catholic priests. Since the year 1700 no Catholic missionaries have permanently remained among them. At most, the length of the mission period was not more than sixty years (1629-1680),† and I think we are justified in the conclusion that we find less evidence of modification from this source than anywhere else in the Southwest. In the

*This festival, so common in all the other pueblos where it is a church observance, is not celebrated in Tusayan, although food is placed for four days after burial over the graves of the deceased. According to W. J. Rouse (Buffalo "Times," February 3, 1895), the bell and carved wood of the altar have now disappeared from the Zúñi mission. Mrs. Stevenson (p. 15) considers that the Zúñi and Tusayan religion and sociology are "virtually free from Catholic influences," which is practically true, but traces of Catholic influences are to be seen in burial customs at Zúñi. The influence of the Indian school at Keam's Cañon in the modification of Tusayan society and religion will be very considerable when the children now taught there take the places of their parents. There are those now in the pueblos who have expressed contempt for the Káteinas, and another generation will see a great change in this interesting survival of aboriginal life.

†Practically the mission epoch in Tusayan extended from 1629 to 1680, opening with Padre Porras and his two associates and closing with the massacres of the great rebellion. Although Porras was poisoned in 1633, Awatobi remained a stronghold of the faith, but with its fall in 1700 active work in converting the Hopi practically ceased, and since that date the Christian faith has hardly affected Tusayan. From time to time apostates fled to this country, but such as did return to the Christian teaching were carried back to Sandia and elsewhere in 1742 and 1780. The influence of the mission epoch was never very great, and it was briefer in Tusayan than in any other pueblos.

complicated ceremonials of this people, many of which I have elsewhere described, we detect no Christian influence of great moment.

Recognizing, as we must, that Christian belief and ritual have exerted a profound influence on the different members of the Pueblo stocks, it behooves the ethnologist in approaching the study of their customs to discriminate between the aboriginal and the incorporated. Evidences of incorporated ritual performed side by side with aboriginal are apparent. How is it with their mythology? I believe here we find like results, varying with different members. Some of these are so clearly due to Christian teaching that I need not spend any time upon them. Others from extreme variations are so akin to aboriginal beliefs that different ethnologists entertain diametrically opposite ideas of their historic or aboriginal origin.

From what is said above it is clear that, other things being equal, from geographical position we should expect the Sia ritual to be more profoundly changed by Christian influences than the pueblos of Tusayan, and that the performance of the Sia snake dance would be more modified than in the isolated province of the Hopi. The gradual extinction of the inhabitants of Sia would hasten this change.

Moreover, in the progress of decay the tendency of a Pueblo ritual is to the consolidation of several rites into one. This process of abbreviation, resulting from outside interferences, leads to composite ceremonials which, when the cultus is flourishing, are differentiated.* Evidences of consolidation are everywhere visible in the Sia ritual. A comparison of the snake ritual of Sia with that of Walpi would be greatly facilitated by an examination of the supernatural personages recognized by the two pueblos. I will therefore preface what I have to say of the snake ritual with a few remarks on the Tusayan equivalents of the supernatural conceptions of Sia as made known by the memoir to which I have referred.†

* Mr. Politzer's interesting observations (San Francisco "Chronicle," October 21, 1894) on the Oraibi snake dance in 1894 have shown what I little suspected, that the Snake society in Oraibi is much smaller than at Walpi. Nowhere in the pueblo region is the cult stronger than at Walpi, although the ceremony at Middle mesa is an easy second.

† This comparison is only of a very general nature and not a detailed one. I have used Mrs. Stevenson's memoir as authority, and am responsible for my condensed exposition of Sia mythology only so far as I have given a correct account of her more comprehensive work. I have not found it easy in many instances to grasp her meaning, possibly on account of the natural obscurity of the subject.

We must ever bear in mind in the study of survivals in Pueblo belief the potent influence in modification due to Christian teaching, to which I have referred. A picture of present beliefs is not necessarily one of unmodified aboriginal beliefs. This is true in a degree of the mythology and cosmogony of Tusayan. To weed out what is modern is a herculean task, perhaps impossible. The best we can accomplish is to use as our standard the least modified Pueblos, if that can be determined. As between the Tusayan and Sia people, I do not hesitate to take the former as the least changed, and have approached the study of Sia mythology with that thought in mind. The supernatural personages are so grouped that they would fall in categories which will not exclude those of Tusayan, on the ground that it is the best which can be done with this subject.* Had there been the interest in this subject and the sympathetic student of it three centuries ago he might have transmitted to us the unmodified mythology and cosmogony of the Pueblo Indians. Today we can do no more than make known what is now believed by these people, more or less modified, and speculate on what part we hear from them is native and what derivative. The subject is capable of scientific treatment.

The Sia mythology, for comparative purposes as well as convenience, will be considered under the following headings, which are not necessarily arbitrary and in many instances different from present beliefs at Sia:

1. Earth Gods and Goddesses.
2. Sky Gods (*parte Paiätämo*).
3. Kopishtaia † (Elemental gods—rain, thunder, etc., peoples).
4. Cultus heroes (offspring of Earth and Sky).
5. World-quarter Gods.
 - a. Animistic and Katsunas.
 - b. Other World-quarter Gods.
6. Paiätämo (*parte*).

* We can do no more than approximate the original beliefs of the Pueblo peoples by a study of the survivals of their mythology. The contribution to this subject, from the least modified, is at best only probabilities, not certainties.

† These are in one sense world-quarter divinities. In Pueblo mythology the great gods appear to me to be the earth-goddesses, the sky-gods, and the two heroes, offspring of earth and sky. The original goddess is mother-earth, who has many names and is "creator" of the innumerable lesser groups represented by 3, 4, 5, and 6 of the above scheme. I have yet to see valid reasons to believe that the Tusayan Indians in their aboriginal system ever entertained the idea of a Great Spirit, creator of heaven and earth, or a philosophical notion of a time when the earth did not exist.

EARTH GODS.

The following Sia earth-goddesses are mentioned with Tusayan equivalents :

Sussistinnako, Spider * Woman	Kokyanwüqti.
Utset	Hahaiwüqti.
Nowutset	Muyinwû (wüqti).
Hishikoyatsaspa	Hüzrûwüqti.

The Tusayan earth-goddesses, Tüwaponitumsi,† Lakonemana, Mamzraumana and others are possibly names of attributes rather than of distinct persons. Calako mana‡ has similarities to Utset and Nowutset.

It would seem from the following quotation that Spider is not always regarded as female: "Sussistinnako is referred to as a man, or, more properly, a being possessing all power; and as Sussistinnako created first man and then other beings to serve his first creation, these beings, although endowed with attributes superior to man, in order to serve him, can hardly be termed gods, but rather agents to execute the will of Sussistinnako, in serving the people of his first creation."

If I rightly understand this quotation, it seems to me, first, that the conception of Spider as a male shows Christian influence, and that the etymology § of the word indicates the true aboriginal conception in Sia as in Tusayan. I find, secondly, in looking for the account of the "first creation" (p. 27) of Spider in Sia cosmogony that they were "two women," Utset and Nowutset, one or both of whom, by direction of Spider, created, among others, the Sun, Katsunas, etc. Considering the way the word god is used in polytheistic religions, I fail to see why we cannot designate them in this way or why one god cannot be an "agent" of a more powerful being; but if the limitation of the word god to Spider is intended as an aboriginal unmodified conception, I have grave doubts in regard to this part of the Sia

* Spider (woman) is "creator" in Sia cosmogony, which is another way of saying the Earth is mother of all, for Haarts, the Earth, existed before Spider woman made living beings, beginning with Utset and Nowutset.

† Complementary female earth deity of Masauwûh, whose representative in Sia mythology is unknown to me.

‡ The Corn Maids; the ear of corn is still used as a symbol of the universal mother (Utset?).

§ From other combinations I take it that *nako* means woman, as *wüqti* (Hopi); but I am not sure except by implication whether *Sussisti* means Spider, since elsewhere *Kopina* is given as the Spider when applied to a "society." The Tusayan word *Kokyanwüqti* is literally Spider woman, and probably this may be the same.

cosmogony. If it would imply that the Sia were monotheists, it needs many facts to support it. That the present Sia believe that "Spider" was the creator is not improbable, but that this belief is aboriginal I question, unless Spider and the Earth are identical conceptions.

I have seen no evidence strong enough to convince me that the Pueblos were originally monotheists, but all probably originally believed as the Tusayan people today, that the Earth is mother, antedating all cosmogony. In one sense this may be called monotheism, but that is hardly the accepted meaning of the term.

SKY GODS.

With the exception of the world-quarter beings later mentioned, the Sia have two sky-gods of highest rank, Oshats, Sun, and Tawac, Moon. The former is distinctly looked upon as a father, but seems to be a creature of Earth. Several sky-gods of the Hopi are not possible to recognize in the account of Sia mythology. Among these are Cotukinuñwa, Taiowa, Kwataka, etc.*

X In one way the Tusayan people regard all supernatural beings as offspring of the Earth and Sky deities, the Sun being called father, the Earth, mother; but this is far from believing that either the sun or earth is regarded by them as a creator in the sense employed in the systems of more cultured people. Mr. Cushing (Proctor's Song of the Ancient People, p. 30) says of Züñi cosmographical beliefs:

It was said by their ancient seers: Before aught was, before even Time began to be, the Holder of the Trails of Life, whose person is the Sun, whose bright shield we see each shining day,—before aught was, save void space and darkness, He was. And by thinking he wrought light, and with light he dispelled the darkness . . . Into these life-sustaining waters he dropped the seed of his being, whence sprang the Sky-Father and the Earth-Mother.

As opposed to this interpretation, which certainly shows in a marked way Semitic and Aryan influences, Mrs. Stevenson finds the sun a creation from a shell (by an earth-goddess), the

* Hecanavaiya, the Tusayan deity called the Ancient of the Six World-quarters, is a very elusive deity or supernal personage in Tusayan mythology. I incline to the belief that he is simply an attributal name of some other god, and since I made out that the sun determines the four cardinal world quarters by solstitial horizon points the theory suggested itself that the ancient of the six points was simply Tawa, the Sun. The Snake Hero was told in the underworld that he should be called Hecanavaiya, and his representative, Wiki, is today ceremonially called by the same name. (See Snake Legend, Journ. Amer. Eth. and Arch., vol. iv.)

earth being preëxistent. Among the Tusayan Indians the earth is always spoken of in cosmogony as existent, and save when foreign influences can be readily traced, I find no knowledge of a spiritual being who created the earth. The Sia cosmogony begins with a created earth.

The hero offspring of the earth gods and sky gods are the Twin War-gods, a conception which is widespread through the pueblo region, where these personages are generally culture heroes.* Among the Sia they are called Maasewe† and Nyuuyewe, and in attributes closely resemble the Tusayan heroes, Püükofñhoya and Palañhoya. Their many deeds, such as killing monsters (Skoyo), which form such a large proportion of their folk-lore, coincide even in details with those of the Tusayan culture heroes. In Sia mythology they are reputed to be the children of Ko'chinako from an embrace by the Sun; and the Spider woman, their grandmother, is their constant mentor and helper. The Tusayan Indians have been so little influenced by Christian teachers that it is not surprising they have no equivalent of Poshaiyänne, Poshyomo, or Poshaiank'ya, around whom so many biblical stories cluster. The word *Pocbutû* retains its original meaning of shaman and is applied to medicine-men who by exorcism relieve the sick. I have found no special *Pocwymпкиya* or *Pocbutû* who has been deified by the Hopi or given special supernal powers. Moctezuma is also unknown even by the Tusayan Tanoan "thinkers," which fact, together with the poverty of stories of Christian origin about any special shaman, would show how much less the Tusayan have been affected by Catholic priests than any of the eastern pueblos.

WORLD-QUARTER GODS.

The cultus of the world-quarter gods occupies a prominent place in Sia, as in other Pueblo myth and ritual. The gods of the world-quarters are referred to six cardinal directions—north, west, south, east, above, and below. In ceremonials in which they are addressed the sinistral circuit is practiced, and the sequence begins with the north. Examples of this circuit are

* It would form a most interesting article to compare the Sia and Tusayan stories of their many adventures in visiting the Sun, their father, and in killing the monsters, but I have not space to enter upon that subject here. There is a close resemblance or even identity in the Sia and Tusayan conceptions of these culture heroes.

† Note the similarity in sound to Masauwñh, the Tusayan war-god.

mentioned in asperging, in ceremonial smoking, etc. There is a similar association of colors with cardinal world-quarters to that in Tusayan, and the same assignment, with the exception of the color for the above and below.

The cardinal world-quarters and corresponding colors are said to be the following :

Titāmi	}	north, * yellow.
Tiita		
Pona	}	west, blue.
Ponami		
Kowa	}	south, red.
Kowami		
Hanami	}	east, white.
Hami		
Tinami	{ zenith,	} slightly yellow.
	{ heavens,	
Nūrkami	{ nadir,	} black.
	{ earth,	

Six world-quarter serpents are mentioned :

Skatowe (plumed),	Serpent of North.
Kaspanna,	" " West.
Koquira,	" " South.
Quissera,	" " East.
Huwaka,	" " Heavens.
Yaai,	" " Earth.

The Tusayan people make use, in a ceremony called the Palū-lūkoñti, of six effigies of their plumed serpent, one corresponding to each world-quarter, but I have not obtained their names, nor do I think there is any great difference in their nomenclature, except in the addition of the corresponding word for color as a prefix. It will be seen that no similarity in radicals exists in the above names of the Sia plumed serpents.

Six world-quarter warriors are mentioned by Mrs. Stevenson :

Samaihaia,†	Warrior of the North.
Shinohaia,	" " " West.
Yumahaia,	" " " South.
Ahwahaia,	" " " East.
Pealhaia,	" " " Zenith.
Sarahaia,	" " " Nadir.

* The magnetic north is not ceremonially recognized by the Tusayan Indians; their cardinal points are solstitial horizon points of the sun.

† The element *haia*, which is common, would seem to mean warrior; but as there is no similarity in the other elements and the prefixes of the plumed serpents of the world-quarters I am at loss to interpret them. I find the same want of uniformity of the prefixes of the trees of the cardinal points.

The Asperger (Nahaipüma) before the kisi in the Walpi snake dance called out (p. 92, op. cit.), as he threw charm-liquid to the cardinal points, "Tcamahia, awahiye, yomahiye, tcimahaiye." These words are incomprehensible to the Hopi, and are possibly Keresän in derivation, invocations to the warrior gods, which would be most appropriate at that time.

The women of the six world-quarters are stated to be :

Kochinako, Yellow Woman of the North.	
Merrinako, Blue	" " West.
Kûrkanfinako, Red	" " South.
Kashinako, White	" " East.
Quisserrinako, Slightly Yellow Woman of the Zenith.	
Munainako, Dark Woman of the Nadir.	

The animals of the six world-quarters are given as :

Mokaite, Cougar of the North.	
Kohai, Bear	" West.
Tuopi, Badger	" South.
Kakan, Wolf	" East.
Tiämi, Eagle	" Heavens.
Maitubo, Shrew	" Earth.

The trees of the six world-quarters are given as :

Shakaka, Spruce of the North.	
Shwitirawana, Pine of the West.	
Maichina, Oak of the South.*	
Shwisinihanawe, Aspen of the East.	
Marshtitämo, Cedar	" Zenith.
Morritämo, Oak	" Nadir.

The birds of the six world-quarters are stated to be :

Hatee, Bird of the North.	
Shasto, " "	West.
Mapeun, " "	South.
Shuwakai, " "	East.
Tiämi, " "	Heavens (the Eagle).
Chaska, " "	Earth.

These six direction supernaturals, whether god, warrior, man, animal, or tree, are of early origin in Sia cosmogony, as will be

* I do not understand why the word for "oak" of the south is so different from "oak" of the nadir, and do not detect in them a common radical for oak. The Oak clan (extinct) is elsewhere (p. 19) called Hapanñi, in which it is also difficult to distinguish a common radical.

seen from Mrs. Stevenson's article, and a similar conception is common to all the Pueblos and to many other peoples.

Why, it has been asked, is world-quarter worship so widely distributed among different people? No satisfactory answer has been given, but the theory that it is a direct outgrowth of sun worship at solstitial risings and settings is not more absurd than many explanations which have been suggested.*

ANIMAL SUPERNATURAL BEINGS.

In this category I place the following from Sia, which are mentioned by Mrs. Stevenson, with their Hopi equivalents: †

SIA.		WALPI.
Shurtsûnna, Coyote		Isauwûh.
China, Mole.....		Mûyi.
Chaska, Chapparral cock.....		Hocboa.
Kakanna } Wolf		Kwewe.
Kakan }		
Mokate } Cougar.....		Tohoûh.
Mokaitc }		
Keowuch.....		Kohone.
Kohaira } Bear		Honauwûh.
Kohai }		
Kohaiya }		
Tä'ñe, Deer.....		Sowinna.
Tuopi } Badger.....		Honani.
Tupina }		
Tuope }		
Sisika, Swallow		_____
Ishits, Scarabæus		Hohoyaûh?
Sika, Locust.....		_____
Shuahkai, Small black bird with white wings.....		_____
Skoyo, Cannibal giants		Natacka, etc.
Kurtz, Antelope.....		Tcubio.
Tiämi } Eagle.....		Kwahu.
Tämina }		
Maitubo, Shrew		_____

The above list included the animal supernatural beings, except those previously mentioned, from Sia and their equivalents from

* The Tusayan names of the bird skins corresponding to the six directions are given in my account of Naacnaiya, and later in the article on "The Tusayan New Fire Ceremony."

† Many of these are personified in Tusayan ceremonies when they are called Katsinas. The supernatural being personified and the dance or act of personification are called by the same name, Katsina.

Walpi. It needs but a glance, however, to show that if the Sia list is supposed to be comprehensive it does not include a tithe of those which might be mentioned from Tusayan. Even such important animal supernaturals as Hawk (Kese), Kwataka (Man Eagle), Bee (Tatañaya), Butterfly (Hokona), Owl (Monwû), and Mountain Sheep (Pañwû), which play most essential roles in Tusayan ritual, are absent. All these in Tusayan, with many others, are called Katcinas, a conception implied in the Sia *Katsuna*, which in Mrs. Stevenson's memoir are not clearly defined.*

The following groups of peoples are likewise powerful in Sia rituals. These are especially interesting in relation to world-quarter worship in the snake ceremonies:

Kopishtaia—

Pôrtuwishta, Lightning people.

Kôwmots, Thunder “

Kashtiarts, Rainbow “

Kachard, Cloud “

The Paiätämo† include, with other supernaturals, the Koshairi and Querränna, the former of which are represented by an effigy on the tiponi altar of the Sia snake ceremony.

I find it quite difficult if not impossible for me to bring my observations of Tusayan mythology into harmony with those of Mrs. Stevenson on the lesser deities of Sia, nor is it essential that this part of the complicated subject be discussed here. Exactly what relation there is between the cloud-chiefs and cloud-people is very difficult to say, and I am not able to shed any light on this and many other difficult questions of similar character. In the lack of knowledge, which ignorance seems equally dense in the minds of other conscientious students of Pueblo mythology, I have passed over the subject in a very unsatisfactory way, awaiting more opportunities for observation.

* A discussion of the Pueblo conception of the Katcinas cannot be undertaken here on account of its intricacy. On the same ground I must eliminate also Hochänni and Siahliia, the Sia equivalents of Hoteani and possibly Pokemû of the Hopi. My object is not to compare the Sia and Tusayan pantheons, but simply those members of it which are necessary to be acquainted with as a preparation to the study of the snake ritual. Hochänni of the Sia (Hotcni in Hopi), according to Mrs. Stevenson, is the “high ruler of the cloud people of the world.” I do not know who the Tusayan Hoteani is, although I am well acquainted with his symbolism. (See my *Tusayan Dolls*.)

† This word recalls Paiakyamû, the Tañon gluttons, who are clowns, “delight-makers,” Koshairi or Koshare.

The personages whom I have called Paiakyamû or Tewan gluttons and figured (in vol. ii, Jour. Amer. Eth. and Arch.), have many points of likeness to the Koshare or "Delight Makers" described by Bandelier. These, I likewise suppose, are the Koshairi of Sia. I am not sure what Tusayan personages correspond to the Querränna of Mrs. Stevenson (Cuirana of Bandelier), and have not yet been able to identify their rain ceremony with any of those which I have seen in Arizona.*

I am in much doubt about the limits of the three divisions said to be creations of the Spider woman, viz :

"1. Paiätämo: All men of Ha'arts (the earth), the sun, moon, stars, Koshairi and Querränna.

"2. Kopishtaia: The cloud, lightning, thunder, rainbow, peoples, and all animal life not included under the first and third heads.

"3. Katsuna: Beings having human bodies and monster heads, who are personated in Sia by men and women † wearing masks."

There is certainly something very obscure here, and new observations must be made or more exact statements before the above classification can be of much value to the student of comparative ceremoniology; or, if the separation of two and three, as here defined, is a good one, the Sia system is so widely different from that of Tusayan that comparisons of the Katsuna † and the Kacinas are impossible.

* I confess my inability at this writing to fathom the meaning of that strange organization, the Tusayan Teukuwypkiya, which includes the clowns, mud-heads, and gluttons. Their strange antics I have repeatedly observed, but no adequate explanation has yet been given me of them. "While the Koshare," says Bandelier, "are specially charged with the duty of furthering the ripening of the fruit, the Cuirana assist the sprouting of the seed. . . . While on certain occasions the latter are masters of ceremonies also, they never act as clowns or official jesters." (Delight Makers, p. 143.)

"Whenever the Katsuna appear," says Mrs. Stevenson (p. 116), "they are accompanied by their attendants, the Koshairi and Querränna, who wait upon them . . . making the spectators merry with their witty sayings and buffoonery."

† I have never seen a woman in a Hopi ceremony wearing a Katsuna mask; women Kacinas are personated by men.

‡ After a faithful study I do not know what Mrs. Stevenson means by a Katsuna, as she seems to me to use the term in several different meanings. No doubt I am equally vague in my use of the Hopi term Katsina. I have, however, tried to define this word, more accurately than is possible here, in an article in a forthcoming report of the Bureau of American Ethnology. Practically all masked dances are Katsina dances, beginning in January and ending in August.

With these preliminary remarks on Sia and Walpi mythology let us pass to a consideration of the Snake ceremony in the two pueblos, as an instance of the similarities of the ritual. The Sia, as the Tusayan snake observance, is a ceremonial for rain, and participants in it prepare themselves for their duties by bodily purifications and other rites.

We are told that the Sia Snake ceremonial is performed "after the ripening of the corn;" the Tusayan takes place in August. (For dates see my Snake memoir.)

For a proper comparison of this weird ceremony in the two pueblos I shall follow the headings adopted in my account of the Walpi snake dance, drawing my material from the Sia memoir. The following have served me as convenient headings for comparative purposes:

1. The Altar.
2. { Ceremonies at the *tiponi* altar.
 a, Making charm liquid.
 b, Invocation to world-quarter deities.
3. { Ceremonies with live reptiles.
 a, Snake hunts.
 b, Ceremonies at the "log house."
 c, Public dance (rites at the "grotto").

I do not follow Mrs. Stevenson in the predominance which she has ascribed to "initiations" in the third heading. The primary object of this component, especially the rites at the "grotto," is not an initiation but rather comparable with the Tusayan dance at the Cottonwood bower in the plaza. It is the acme of the snake ceremony with a distinct purpose; novel to a novice; possibly so worn down that but little remains but the initiation ceremony, an episode, not the main object of the performance.

THE TIPONI ALTAR.

In a comparative study of the Tusayan altars in their many variations, with all their modifications, I find one object which is always present in kiva observances. To this object fetishes, sand pictures, reredos, in fine paraphernalia of all kinds, are accessories. This constantly present object, indeed that which makes the altar, is the society "mother" called by the Hopi the *tiponi*. Two of these *palladia* are used on the altars of the

Walpi snake ceremonials, one representing each of the societies which participates in it. Six tiponis (iärriko) were placed on the Sia altar, four of which belonged to the chief (honaaité).

A large part of the distinctive characteristics of the altars of different societies is made up of accessories, of which the following may be mentioned: 1, Sand pictures; 2, Reredos; 3, Images, fetishes; 4, Pahos, prayer feathers, sacred meal,* and pollen; 5, Paraphernalia used in other rites, as nakwipi (medicine bowl, corn, aspergill, etc.).

The accessories of the tiponi altars of the Sia and Tusayan snake ceremonials differ considerably, showing evidences of consolidation or want of differentiation or both. The two altars, that of the Snake and that of the Antelope, are possibly represented in Sia by a single tiponi altar.

Two sand-pictures are found combined in the Sia altar, one of which is comparable with the Antelope sand-mosaic, the other with the Snake.

I have in my article on "The Tusayan New Fire Ceremony" † pointed out the distinction between a tiponi altar and a cloud-charm altar. Any altar, simple or compound, upon which a tiponi stands is a tiponi altar, but the tiponi is not necessarily on the altar used in the making of the cloud-charm liquid or the invocation to the world-quarter deities or supernaturals.

These are represented on plate xiv of the Sia memoir. The former, instead of four sets of four different-colored semicircles, representing rain-clouds of the world-quarters, form different colored lightning symbols; and a quadruple border surrounding the whole is represented in two colors, black and white, consisting of three white rain-clouds, and four black lightning symbols, the whole destitute of a border.

The second sand-picture of the Sia altar approaches more closely that of the sand-mosaic of the Snake priests at Walpi, but in its design the colors are differently arranged, and the lightning snakes extend radially from the corners of the border instead of parallel with the sides. The place occupied by the outlines of four snakes in the Walpi Snake altar is filled in the Sia by four triple rain-cloud symbols, each triplet different in

* Sacred meal is of course in a sense not an accessory; there is no altar without it, but it does not, like the first three, distinguish the character of the altar.

† Proc. Bost. Soc. Nat. History, January 2, 1895.

colors. The mountain lion, which is drawn within a rectangle, is common to both the Sia and Tusayan Snake sand-mosaic.*

The altars of both the Antelope and the Snake societies at Walpi are destitute of an upright frame or reredos which forms such a conspicuous feature (plates XIV, XV) back of the Snake altar at Sia. The third group of accessories, fetishes in human or animal form, as represented at Walpi by the seven animal effigies mentioned in my account, but there are no effigies corresponding to the following, said to be found on the Sia altar:

Kochinako, "Yellow Woman of the North;" † Maasewe and Uyuunyewë, Twin Gods of War; Six Warriors of the Six Mountains; Three Koshairis (clowns?); Fetish of White Stone Bear; Two Coiled Stones representing snakes; Cross ‡ (decorated with feathers).

The simple fact that a cross occurs on the altar is not necessarily an evidence of Christian influence, although in this case it may be probable. Cross-shaped paho were used by the Pueblo people when they were visited by Coronado in 1540 and were described by Castañeda (p. 239, Ternaux-Compans): "A Acuco, nous trouvâmes près d'une fontaine une croix de deux palmes de haut, et d'un doigt d'épaisseur. Le bois en était carré, et il y avait autour beaucoup de fleurs sèches et de petits bâtons ornés de plumes. "A Tutahaco, nous trouvâmes sur une sépulture [pahoki] qui paraissait récente une croix faite de deux morceaux de bois attachés avec du fil de coton, et ornée de fleurs desséchées."

The rows of crooks (gnelükpi), which surmount the sand-mosaics of the Antelope and Snake altars at Walpi, appear not to be represented at Sia, unless we find their equivalents in "two

* The arrangement of the different colored sands as represented in plate XIV would greatly offend a Hopi Snake priest, with whom the sequence is always, whether in circuit or on borders, yellow, green, red, and white. I question the accuracy of the arrangement of colors in the second sand-picture of the Sia altar figured on plate XIV of the memoir.

† I suspect that this effigy of Kochinako is an attributal name of some earth goddess.

‡ A paho in the form of the cross was, however, made and deposited in the fields during the Walpi Snake ceremonials, as I have described (op. cit., p. 51). In the winter solstitial rites (Soyaluŋa) a similar cross-shape paho is likewise manufactured, and called a wu-ka-si paho, or by some a Ka-wai-ka (Keresan) paho. On being asked if this cruciform object had not the same significance as that placed by the Castilians over their missions, the maker responded, "No; I make it because I wish an ox! I want oxen with spotted bodies, and the spots I paint on the shaft of the paho represent those which I wish on the animal." The cross on the Sia altar shows Christian influences, according to Mrs. Stevenson.

wands of turkey plumes standing in clay holders." The fine old stone implements (teamahia) of the Antelope altar are comparable with "two finely polished adzes, 12 inches long," and "two stone knives."*

The paho, sacred meal, and pollen are common to all altars and are to be expected both at Walpi and Sia on the Snake altars. More will be said of the first of these objects when I speak of their delivery to the couriers.

For the arrangement of the objects on the altar I have followed the description which unfortunately does not agree † with the figure (plate xv). Only two of the six tiponi are figured and the position of one of the sand-pictures is not clear to me. I am therefore obliged to limit myself to generalities and cannot carry a comparison into details.

Of minor objects peculiar to the Sia altar may be mentioned the following:

Tawaka, "gaming blocks and rings for the clouds to ride upon;" Maickûriwapai, six direction's birds' feathers (see bird skins in my account of the Tusayan New Fire Ceremony); "sacred honey jug (a gourd);" shell with corn pollen; rattlesnakes' rattles; nakwipi (medicine bowl); miniature bow and arrow before each tiponi; bear-leg skins and necklace of bear claws.

Any or every sacred object efficacious to bring rain is naturally placed on the altar at Walpi, and, unless I am greatly surprised, the next ethnologist who describes the Antelope Snake sand-picture will find upon it a large specimen of the horseshoe crab (*Limulus polyphemus*), "giant tadpole," which I presented the priests in 1893.

CEREMONIES AT THE TIPONI ALTAR.

X That part of the Sia snake ceremony which is described on pages 79-84 bears evidence of being composite, including at least

* As these are the same that the "medicine-maker" strikes together in making "medicine water," even Kakapti's act of beating the floor with a teamahia (p. 23, Snake Dance), is not without a parallel at Sia.

† Mrs. Stevenson explains this difference in the following way: "Unfortunately, the flash-light photographs of the altar of the Snake society made during the ceremonial failed to develop well, and, guarding against possible failure, the writer succeeded in having the homaite arrange the altar at another time. The fear of discovery induced such haste that the fetishes, which are kept carefully stored away in different houses, were not all brought out on this occasion."

two elements which are differentiated at Walpi, the invocation to the six world-quarter gods and the making of the cloud-charm liquid. The former of these necessarily presupposes the latter, and it is not unusual in other Tusayan rites (as Niman Katcina) to find them consolidated, although in elaborate observances like the Walpi snake dance they are distinct. I have tried to separate the elements of each in the Sia altar ceremony. The following acts, among many, I would refer to the making of the "medicine:"

1, Gourdfuls of liquid pounded into the nakwipi (medicine bowl), with preliminary dedication by passes to the world quarters; 2, Pebble fetishes, six in number, dropped in turn into the liquid with similar intent; 3, Dipping knives into the liquid; 4, Addition of tochainitiwa ("a certain herb used by cult societies to produce suds"); 5, Addition of meal or pollen; 6, Smoking* above or into the liquid; 7, Songs (incantations) and prayers.

Mrs. Stevenson says (p. 81): "The preparation of the medicine water began with the opening of the seventh stanza." I suggest that it began earlier or when the "maker of medicine water" "proceeded to consecrate the water" (p. 80).

These elements of the Sia † ceremony about the altar I would compare with the making of the medicine in the Moñkiva at the beginning of the snake ceremony at Walpi, where (as described on page 15 of my memoir) they are celebrated with modifications in detail, but as a ceremony distinct from the sixteen-song ceremony enacted later in the day. •In the remaining acts of this composite rite about the Sia sand-picture I find traces of what I have called in my Snake memoir the Sixteen-songs ceremony, which is a consecration of pahos and

INVOCATION TO THE RAIN GODS OF THE SIX WORLD-QUARTERS.

The ceremonial acts referable to this component are like those of the same at Walpi: 1, Asperging to the world-quarters and upon objects of the altar; 2, Striking stone implements on the floor or together; 3, Prayers and ceremonial smokes; 4, Purifications; 5, Delivery of the pahos to the couriers.

* Ceremonial smokes are constant features at the opening and close of the making of the cloud-charm liquid in every great ceremony at Walpi.

† At Sia the making of the charm liquid (medicine) is accompanied by posturing and dancing. This has escaped me in Tusayan observance, in which this liquid is made.

The vein of similarity which runs through these and like components of the Sixteen-songs ceremony is so easy to trace, even when so much modified, that I have simply pointed out the existence of similarities, but the prime essential of this component of the invocation is the prayer-stick, the paho, which may be said to be consecrated by these acts.

In the paho of both Sia and Walpi societies we have tangible objects to compare, and an account of them naturally precedes a notice of their delivery to couriers.

The Sia paho (of the snake ceremony?), judging from Pls. XI, XII, and XIII,* differ somewhat from the Walpi (cf. pp. 27, 71). No Walpi Snake or Antelope paho has a face or incised ferule cut on either shaft, and every paho has a package of meal (*nüciata*) tied to it, and a turkey-tail feather, a corn-husk, or the herbs *pamnavi* and *kürnyû*. These appendages are not represented on any of the paho figured in the Sia memoir. There are many other differences, but as the figures in plates XI, XII, and XIII are not specially described I am unable to carry my comparisons into details. The figures on plate XIII show a single-stick paho, but differ widely from the Snake paho and that of *Masauwûh*, which are the only single-stick pahos used in the Walpi snake ceremony (see p. 27)†; all the others are double.

Sacred meal and corn pollen are used in the Sia as in the Tusayan rites. The latter is sprinkled on the head of the snakes by all the members in the ceremonials of the fifth day (p. 87) at Sia, and is used for the same purpose in the Walpi snake dance (p. 40, Walpi ceremony). In the legend of the Snake Hero it is said (p. 116) that the Snake people ate corn pollen for food. At certain times in the Sixteen-songs ceremony the altar is sprinkled with corn pollen, although meal is generally used.

At the close of the Sixteen-songs ceremony at the altar of the Walpi Antelopes the pahos are given to a single courier (*Kakapti*) to deposit in the world-quarter shrines. Two bearers receive

* Mrs. Stevenson does not state that the paho represented on plates XI, XII, and XIII are distinctively Snake paho, but figures them as *hächamoni* (paho) with or without feathers. As no one of them is distinctly referred to the Snake society, my comparisons must be as general as her references to them.

† My cut of this paho was drawn by an accomplished artist, Mr. S. F. Denton, from an original in my collection, which was made for me in the kiva, with the others, by the Antelope priest, *Masiumtiwa*. Dr. Matthews' fear (*Amer. Anth.*, October, 1894, p. 422) that it is faulty is perfectly groundless, as any one may see by inspection of the original and the copy.

them, with a "litany," in the Sia celebration (pp. 84, 85). As nothing is said in regard to the place where the Sia pahos are deposited, I will simply refer the reader who wishes information on this point in the Walpi rite to my memoir (p. 35).

The final event in the life of the altar was its dismantling and the wrapping up of the fetishes and tiponi, between which there is a general similarity at Sia and Walpi. The efficacy of the sand and the use which is made of it has the same meaning in Tusayan and Sia, and pertains to many such pictures, as can be seen by consultation of my articles on other ceremonies.

A paho is said to have been made for Spider woman in the Sia snake dance. Although I have not learned that the Tusayan Snake priests made one of these prayer emblems to this personage, the details of the story of the Snake Hero would seem to call for one at their hands. Masauwuh is remembered at Walpi, as I have elsewhere recorded.

CEREMONIES WITH LIVING SNAKES.

Our knowledge of these rites at Sia is imperfect, and what has been recorded seems to have been derived from hearsay. The phraseology and kind of type used in the Sia memoir in the "account of the initiation of a member into the third degree of the Snake order" (p. 86) leaves me in doubt whether that which is recorded on page 87 was seen by the author or reported by the "vicar." The limitation of the first person singular of the personal pronoun to the smaller type implies that the larger type was a result of personal study, while the context indicates that all the "initiation" (pp. 86, 88) was given by the "vicar."

I do not regard the rites described as primarily initiation ceremonials, but incline to the belief that we have in them fragments of several ceremonials, possibly worn down so much that the "initiation" is most prominent.* Every ceremony in which a novice participates for the first time he may regard as an initiation, as it is from his point of view.

The following component rites are recognizable in the Sia "initiation:" 1, Snake Hunts; 2, Ceremonials (in log house) about an altar; 3, Ceremony at the "cornstalk" bower, "grotto."

* Of course it may be that in the more elaborate Walpi ceremony these have been differentiated from a ceremony like that of the Sia.

The snake hunts at Sia took place, as at Walpi, on successive days in sequence corresponding to the north, west, south, and east world-quarters, and pahos were deposited in these at Snake shrines. The number of reptiles used at Sia is very small, but the signification is the same. The part which the novices play in these hunts is not clear to me and I have never been allowed to witness the capture of a reptile on the snake hunts at Walpi. As at Sia there are "three members" of the Snake society, only the north, west, and south are visited for the collection of snakes, but the members must go to the east and deposit hächamoni (paho) to the snake honaaite* of the east.

X The snake hunts at Sia last four days, and on the fifth day we have the Sia abbreviation or representation of the Walpi ninth day.† The first of these are the rites in the "log house" about an altar (sand-picture), part of which is comparable with that of the Snake priests in the Wikwaliobi kiva. Different as the two ceremonials appear to be, I believe that this rite at Sia is comparable with the Walpi snake washing, when the reptiles are taken from the jars and violently thrown across the kiva. In the "log house" they are simply laid on the floor. X "The ritual begins with the rattle and song, and after the song the honaaite, passing before the line of women on the north side, takes a snake from a vase, and, holding it a hand's span from the head, advances to the east of the sand-painting (which is similar in plate xiv, with the addition of two slightly diverging lines, one of corn pollen, the other of black pigment, extending from the painting to the entrance of the house) and lays it between the lines with its head to the east."‡ "The snake is then placed around the throat" of one of their number "novitiate," and later deposited in a jar. This is repeated with the other snakes.

It seems incredible but by no means impossible that the weird snake washing at Walpi has a counterpart in this quiet rite, but there are several likenesses which lead one on to compare them. Both are highly modified, perhaps from an ancestral presenta-

* Although it is not distinctly said who this Snake chief (honaaite) is, I think it will be found to be the equivalent of the Plumed Snake of the East, comparable with Palülükof.

† With some elements of the seventh day, viz, the initiation ceremony in the Wikwaliobi kiva (see pp. 62-65).

‡ No mention is made of bathing the snakes, an essential feature in this ceremony at Walpi. I can only account for the women in the ceremony by supposing elements of the seventh day's initiation at Walpi are introduced.

tion, but it seems to me that these modifications are not too great to render it improbable that they are the same.* If we remember that the Walpi use in their biennial snake dance sixty reptiles, it will readily be seen that it would take a long time to lay each snake by the altar, place it on a novice, and put it back in a jar. Allowing five minutes for this act with each reptile would make a ceremony five hours long at a minimum calculation. The germ of the idea which pervades both the Sia and the Walpi component is an introduction of the reptile to its home, the altar, and a sanctification of their prayers † by its presence.

None of the Sia components thus far considered have any hint of the Walpi snake dance on the open plaza, when the hideous reptiles are carried in the mouths of the participants, the horrible acts which have furnished so much welcome material for sensational newspapers. Has the Sia celebration a component to compare with the public dance at Walpi?

The exercises near the grotto ‡ are, I believe, comparable with those at the Walpi kisi (cottonwood bower) on the ninth day. At this time, however, at Sia, the reptiles are not carried in the mouth, but borne in the hands or passed into the hands of others. While they take place, songs are sung and rattles sounded, and at the close the reptiles § are released, one to each world-quarter.

I cannot do better than to quote from Mrs. Stevenson's account of the Sia snake dance to give an idea of this ceremony :

"Upon the opening of the song and dance the ho'naaite procures a snake at the entrance of the grotto and holding it horizontally with both hands presents it to the novitiate, who receives it in the same manner, clasping the throat with the right hand; the ho'naaite and novitiate pass back and forth north of the line from the grotto four times. . . . The ho'naaite then takes the snake and returns it to the man in the grotto." At the close of this portion of the dance two or more men "are requested

* If the Sia priests had sixty instead of three reptiles to place on the floor by the altar they might find it difficult to manage them, and find it expedient to throw the reptiles on the sand picture as the Walpi Snake priests do today.

† The purport of the prayers to the snakes is an exhortation to them to intercede with the Cloud gods to bring the desired rains. I fail to find any more snake worship in the Sia than in the Walpi observance.

‡ This I suppose to be another name for "a conical structure of cornstalks bearing ripe fruit," which is erected 70 feet east of the log house (p. 87). If I am right I would further compare this "grotto" with the cottonwood bower or Kisi at Walpi.

§ The Sia Snake society is called Shuwi Chaian. Note the similarity of the Keresan word shuwi with the Hopi word for snake, teña.

by the ho'naaite to enter the grotto and receive the vases from the man inside. These they carry to a cave and . . . take out each snake separately. . . . The first snake is deposited to the north, the second to the west, the third to the south, and the fourth to the east; this is repeated until all the snakes are disposed of" (p. 89, op. cit.).*

Widely different as the acts at the Sia snake "grotto" are from the stirring events of the Walpi snake dance, with its fearless carrying of reptiles in the mouths, the many exciting episodes, and the wild rush of the participants† at its close to the four-world quarters, there still remains a likeness between the two.‡

Whether the resemblances between the Sia and the Tusayan snake dances are close or remote, it seems to me that it would be much better not to call the ceremonials at the "log house" and "grotto" initiation ceremonies unless we are prepared to designate the Walpi snake dance by the same name. Mrs. Stevenson's informant called them so, perhaps, because he thought they were; in fact, to him they were initiation novel-ties, but they bear marks of being veritable rites for rain.

This examination of what is known of the Sia snake ceremony has convinced me that what is needed most of all for future comparisons is a reinvestigation of this ritual and a verification of many doubtful points. Personal studies of the ceremonials at the "log house" and "grotto" ought to reveal much more than we have. Mrs. Stevenson has done valuable pioneer work in her studies of Sia and is to be congratulated on the results, and it is to be hoped that she or other ethnologists will

* I confess I am at a loss to know how many snakes were used by the Sia, but this quotation leads me to believe a considerable number. On page 85 I read, "the number of snakes required depending upon the membership, the ratio being equal to the number of members. There must be a snake from each of the cardinal points, unless the membership is less than four, which is now the case."

† The dress of the "Snake division" (p. 88) differs from the paraphernalia of the Snake priests at Walpi. The Sia priests wear "fringed kilts of buckskin with the rattle-snake painted upon them, the fringes being tipped with conical bits of tin." The Walpi snake kilts are of cloth, fringed with triangular pieces of metal, also bent into cones, with the headless body of a snake upon them. The moccasins of the Sia Snake priests are said to be painted with kaolin, those of the Tusayan are covered with red (iron oxide). Plate XVII gives a picture of a Snake vice honaaita on whose kilt a head of the snake is depicted. The head is absent and only the body remains on the kilt of Tusayan Snake priests (p. 79).

‡ Indefinite stories are current in Tusayan that eastern Pueblos have a snake dance but do not carry the snake in the mouth. The Sia celebration would seem to show the truth of these stories.

rescue still more of the survival of the Sia ritual before it passes away forever. The ritual of the Pueblo Indians is practically virgin soil for the investigator and its cultivation is sure to yield valuable results.

From the preceding discussion of material available on the Sia and Tusayan snake ceremonies, one conclusion of importance is thrown into clear outlines. ~~X~~ This ceremony at Sia and at Walpi has so many elements in common that we can conclude that they are parts of related rituals. Their identities mean contact, and cement stronger than has yet been possible the eastern and western Pueblo peoples. In connection with linguistic and documentary evidences, they show that in essentials the Arizonian and New Mexican Pueblo culture is the same. The fastnesses of Tusayan have received many groups of families from the Rio Grande region and assimilated with them. From them Hopi, Tanoan, and Keresan fugitives have returned to their old homes. The Pueblos have been churned together over and over again too many times to allow the ethnologist to be able to distinguish "Moquis" from "Pueblos."

One more word. Sia is said to belong to that linguistic group of Pueblos called Keresan. Acoma, where Espejo saw dancers with reptiles in 1582-'83, is of the same stock. Legends say that the snake dance is the cult of the oldest people of Tusayan. These facts mean something or, rather, several things, one of which is that the original Tusayan cult has kinship with that of the Keresan, the oldest of the linguistic stocks of the Pueblos.

THE FIRST DISCOVERED CITY OF CIBOLA

BY F. W. HODGE

Through the labors of Mr. Adolf F. Bandelier* it has become quite definitely established that the region now known as Arizona was first visited by whites in the middle of the year 1538, when Fray Pedro Nadal and Fray Juan de la Asuncion (or de Olmeda) penetrated the southern part of that territory. There the friars learned that to the northward were many-storied pueblos inhabited by people who wore clothing and possessed an abundance of turkis. This was probably the first news of the Pueblo Indians to reach Mexico, for although Nuño de Guzman about nine years previously (in 1529) heard of the existence of "seven towns" in the northern country, it is possible that the subsequently discovered "Seven Cities of Cibola" were quite distinct from these. Indeed, mention of a suppositional group of "seven caves" in the new country was made soon after the Columbian discovery, while a legend of seven cities originated in the Old World as early as the ninth century, was imported to the New, and coincidentally found its realization in the so called Seven Cities of Cibola.

In September, 1538, or very shortly after the return to the City of Mexico of the two monks above mentioned, Marcos de Niza, a Franciscan friar, set out from the capital under authority and instruction from Antonio de Mendoza, then viceroy of New Spain, to explore the inhabited region of the far north. There accompanied Niza, as guide, a negro named Estévan or Estévanico, who had been a companion of Alvar Nuñez Cabeza de Vaca, Andrés Dorantes, and Alonzo de Castillo Maldonado. These four survivors of the ill-fated expedition of Narvaez, which about 1529 was wrecked in the Gulf of Mexico west of the Mississippi delta, found their way to the Mexican capital after seven years' wandering and untold suffering.

* *Contributions to the History of the Southwestern Portion of the United States*: Arch. Inst. Papers, v, 1890. *Documentary History of the Zuñi Tribe*, in Jour. Am. Ethnol. and Arch., edited by J. Walter Fewkes, iii, 1892.

The story of Niza's journey has been more than twice told ; hence it is not necessary to repeat it in detail here.* The negro was sent in advance with a number of Indians, who were joined by others as they proceeded on their journey. While among the Opatas of Sonora, Estévan sent to Niza the first information regarding Cibola ; and as the friar hastened onward, being hospitably received by the Piman natives, through whose territory he was now traveling, the news of the populous and wealthy nations of the north received through runners sent by the negro grew more and more promising. The so-called *despoblado*, now covered in part by the White Mountain Apache reservation, was soon crossed, but when within two or 'three days' journey of Cibola the friar was astonished at meeting one of the Indians who had accompanied Estévan and learning from him that the negro and a number of his Indian companions had been killed by the Cibolans, and that those who had escaped were fleeing for their lives.

It is not necessary to enter into details concerning the death of Estévan, nor to relate the causes which led to it. Friar Marcos held a parley with his natives, hoping to induce them to accompany him to Cibola, but they were so overcome by fear as well as so incensed at the death of their kinsmen, for which they held Niza responsible, that they not only refused to accompany him, but threatened his life. The judicious distribution of some articles which Fray Marcos had brought with him, however, dissuaded the Indians from executing their threats, and he even finally succeeded in inducing them to continue the journey ; but when within a day's travel of the first village they encountered two more fugitives from Cibola, sorely frightened and covered with blood. The sight of the wounded and abject Indians renewed the anguish of their brethren and it took Niza a long time to soothe them.

Himself threatened with death by his Indian companions, the friar had no hope of entering Cibola, yet he was bent on obeying the orders of the viceroy, if his life should be spared, by at least looking upon the town. At last, accompanied by his own Indians

* For fuller accounts see Bandelier, op. cit. ; also his "*Discovery of New Mexico by Fray Marcos of Niza*," in *Mag. Western History*, September, 1886. *Early Explorations of New Mexico*, by Henry W. Haynes, in Winsor's *Narr. and Crit. Hist. Am.*, vol. ii, chap. vii. W. W. H. Davis, *Spanish Conquest of New Mexico*. Reference to original documents are given in these treatises.

and two chiefs of the tribe* whose people had been killed with Estévan, the obedient Niza made his way to the heights overlooking one of the towns. Here he erected a small cross, formally took possession of the country, and hastened back to Mexico. Upon his arrival he submitted to the viceroy a narrative of his exploits.

Careful attention was apparently not given by the officials to Niza's *relacion*, for there was a notable lack of discrimination between the record of his personal observations and of the stories which were communicated to him by the Indians whom he encountered concerning the country and its wonderful riches. Consequently, when Coronado and his army, guided by Niza, in the following year found that Cibola comprised several villages of stone and mud, with no gold or other metals, their disappointment knew no bounds, and the anger of the soldiers and the maledictions they uttered against the defenseless friar are mentioned by both Coronado and Castañeda, neither of whom forgot to contribute his share of calumny.

Mr. Bandelier has established quite satisfactorily that Niza was honest in his assertions, the fabrications concerning Cibola being recorded by the friar as having come to him through hearsay.

It is regarding the identity of the village at which Estévan lost his life and which Niza observed from a distant height that question has arisen. The name of one of the Cibolan villages the friar learned from an old Zuñi whom he found living with one of the Piman tribes and who had been a fugitive from Cibola for many years. This name was Ahacus, and is identical with Hawikuh, a pueblo occupied by the Zuñis until about 1670, when the Apaches compelled its abandonment. It should be remembered, however, that the name Ahacus was not applied by Niza to the pueblo visited by Estévan and seen by himself, nor indeed to any other pueblo; hence the question as to which of the cities of Cibola was first discovered.

The place of the killing of the "Black Mexican" is fixed by Zuñi tradition at K'iakima, and this tradition Mr. Bandelier has attempted to substantiate by applying thereto the description by Niza as well as by other documentary testimony bearing on the point. It is my purpose to show that not K'iakima but

* Probably the Sobaipuri Papagos.

Hawikuh was the town of Cibola discovered by Niza, that the latter village alone corresponds substantially with the settlement described by the friar, and that Zúñi traditional accounts of events which occurred over three centuries ago are not worthy of consideration as historical or scientific evidence.

In order that there may be no difference in terms employed I will recite Mr. Bandelier's own translation from the Spanish of the description of the Cibolan village seen by Niza when he took possession in the name of the King of Spain of the territory now forming Arizona and New Mexico.

Reviewing that portion of the friar's narrative relating to his desire to continue onward to Cibola after the death of Estévan and some of his companions, Mr. Bandelier says: "His Indians were unwilling to accompany him. They not only resisted his entreaties, but threatened his life, in atonement for the lives of their relatives slaughtered at Cibola. He pleaded and remonstrated, but they remained stubborn. At last two of their number—'principal men,' he says—consented to lead him to a place whence he could see Cibola from afar. [Then quoting Niza:] 'With them and with my Indians and interpreters I followed my road till we came in sight of Cibola, which lies in a plain on the slope of a round height. Its appearance is very good for a settlement,—the handsomest I have seen in these parts. The houses are, as the Indians had told me, all of stone, with their stories and flat roofs. As far as I could see from a height where I placed myself to observe, the settlement is larger than the city of Mexico.' . . . Here, again, in sight of Cibola [now continues Bandelier], his Indian guides reiterated the statement that the village* now in view was the smallest one of the seven, and that Totonteac [Tusayan] was much more important than the so called Seven Cities. After taking possession of Cibola, Totonteac, Acus, and Marata for the Spanish crown, raising a stone heap, and placing a wooden cross on top of it with the aid of the natives, and naming the new land the 'New Kingdom of Saint Francis,' the friar turned back, 'with much more fright than food,' as he very dryly but truthfully remarks."†

* The statement in his *Gilded Man* (p. 155) that Niza and his companions "at last reached a hill whence they looked down into a valley in which lay several villages" is an error; but one village was seen.

† Bandelier, *Contributions*, op. cit., p. 160, 161.

The natural approach to Zuñi from the southwestward, the direction whence Niza came, is by way of Little Colorado and Zuñi River valleys. Any other route from that direction would lead through a region of utter desolation, extremely difficult of travel by reason of its broken and arid character. The valley through which Zuñi river flows on to the Little Colorado part of the year, is easy to travel, and it may be reasonably assumed that water was abundant at or within easy reach of the sandy river bed when Niza's little force wended its way toward Cibola late in May of the year 1539. To have left the valley would have increased the distance which the barefoot friar must traverse, besides leading him over an indescribably dreary and rugged stretch. It therefore would seem that Niza, as well as Estévan, approached Zuñi by the valley route over which Coronado, guided by Niza, went a year later—a route leading directly to Hawikuh, the southwesternmost of the Cibolan towns, and one of the two largest of the group. From the southwest K'iakima, which lies at the southwestern foot of Tâaiyalone or Thunder mountain, in the eastern part of the plain, can be reached only by the tortuous route alluded to. Moreover, K'iakima was the most remote of all the Cibolan pueblos when approached from the southwest, Matsaki alone excepted.

In the light of these facts, then, what would have been Niza's object in visiting K'iakima, particularly when guided by unwilling natives, who evidently had visited Cibola before? Had he made a detour before reaching the vicinity of Hawikuh for the purpose of viewing K'iakima from the adjacent mesas, Niza scarcely would have used the words: "I followed my road until we came in sight of Cibola;"* that is, the road he was following; the *only* road.†

The friar describes the pueblo as lying "in a plain at the slope of a round height." This is one of the most significant points in the narrative in favor of Hawikuh. This ruin was surveyed by

*The term Cibola is specifically employed by Friar Marcos to designate the single village which he saw.

† "There existed, in 1539, and prior to it, quite an intercourse between Zuñi and the land-tilling aborigines south of the Gila river. That intercourse took the form of journeys made by the Opatas, the Southern and Northern Pimas, and possibly the Eudeves and Joras, to Cibola-Zuñi, for the purpose of acquiring turquoises and buffalo hides."

Bandelier: *Documentary Hist.*, op. cit., pp. 3, 4. This being the case, there must have been a well-used trail for Niza to follow via Zuñi valley to Hawikuh, the only practicable route.

Mr. Cosmos Mindeleff, and a carefully prepared ground-plan is reproduced in the memoir "Architecture of Tusayan and Cibola," by Victor Mindeleff, in the eighth annual report of the Bureau of Ethnology. This author describes (p. 80) the ruin of Hawikuh as "occupying the point of a spur projecting from a low rounded hill," a description coinciding precisely with that by Niza. Moreover, Hawikuh is so situated in a plain as to command a view for miles in every direction,* a situation worthy of the enthusiasm of even the undemonstrative Niza, who described it as "the handsomest I have seen in these parts." K'iakima, perched on its inconvenient knoll of talus and cowering under the protection of old Taaialone,† could not have conjured up this outburst of praise from the honest old friar.

K'iakima, it will be seen, is not in a plain. A view toward that pueblo from the southern heights is completely closed by Thunder mountain, which here seems to wall the very universe.‡ Furthermore, I am confident, through personal observation, that the mountain does not appear to be round from either the west or the south.

Niza could never have been so deceived in the appearance of K'iakima as to have said: "Where I placed myself to observe, the settlement is larger than the city of Mexico." Such a comparison might truthfully have been made with Hawikuh, however, situated as it was in a broad plain, with no beetling height to belittle it.§

Mr. Cosmos Mindeleff, who made a careful survey and study of the K'iakima ruin, informs me that in all probability the houses did not exceed one story. Those of Hawikuh, in the language of Mr. Victor Mindeleff, considering "the large amount of débris and the comparative thinness of such walls as are found, suggest that the dwellings had been densely clustered and carried to the height of several stories." In this connection it is of

* See plates XLVII and XLVIII of the Mindeleff paper referred to. The ruined church dates from about 1629.

† See Mindeleff, *op. cit.*, plates LII and LIII.

‡ The view of the mountain shown in plate LIX of Mindeleff's paper is from the west. K'iakima is situated near the corner at the right of the picture, Matsaki at the corner to the left.

§ Mr. Bandelier believes that the population of the City of Mexico could not have exceeded 1,000 at this date. Hawikuh in 1540 numbered 200 warriors (Coronado says houses) or between 800 and 900 souls. Judging from the extent of the ruins of K'iakima, its population could not have been half as great.

moment to observe that Niza speaks of the houses as "all of stone, *with their stories* and flat roofs," a reference that under the circumstances could not pertain to K'iakima.

The reiteration of the Indians "that the village now in view was the smallest one of the seven" I believe to have been mere braggadocio, and contained as much truth as their allegation in the same breath that Tusayan was much more important than Cibola. Any statement to the effect that the smallest village of the Cibolan group was larger than the City of Mexico is incredible.* Niza has shown himself to have been a man of truth. The many groundless assertions of the Indians as recorded throughout this and subsequent Spanish narratives speak for themselves.†

Yet the clause "the village now in view" is of the utmost importance. Indeed, if there were no other evidence that Hawikuh was the village seen by Niza this would suffice, for inasmuch as K'iakima is visible only from the southeast and south, there is no point of view from these directions that would not include Halona ‡ (the site of the present Zuñi), and from any point farther westward along the southern eminences Matsaki also would have been seen. From the heights south of the plain on which Hawikuh was situated, however, one village only was observable in the sixteenth century. That village was Hawikuh, and the massive walls of the ruined adobe church erected in the seventeenth century still rise above the plain. T'kanawe § (a triple pueblo of which Kechipauan formed a part), on the

* The *Posadera de Sivola* (1540) says the largest village of the province "may have about 200 houses, and two others about 200, and the others somewhere between 60 or 50 and 30." According to Vetancurt, Halona and Hawikuh were the largest villages a few years before the revolt of 1680, with 1,500 and "more than 1,000" inhabitants respectively. In Coronado's time Matsaki was regarded as the largest of the Cibolan pueblos, but it had degenerated during the following eighty or ninety years. Accepting the figures of the *Posadera*, that three villages (Halona, Hawikuh, and Matsaki) had 200 houses each, the largest of the remaining four pueblos could not have exceeded 60 houses, or about 250 inhabitants, while the smallest of the seven cities had but 30 houses with about 150 occupants. The population of K'iakima therefore must have been between 150 and 250, a figure far below what would have been regarded a fair comparison with the Mexican capital.

† It will be remembered that the Quivira delusion was due to the misrepresentations of the Indian Bigotes.

‡ And also Pinawa if that village was one of the group.

§ T'kanawe is the "Canabl" of Oñate (1598), and was one of the Cibolan cities. It contains the standing walls of a stone church which in all probability was never finished or used. The village is not mentioned by Vetancurt, consequently it appears to have been abandoned between 1629 and 1670, the latter being the approximate date of the abandonment of Hawikuh.

mesa to the southeastward, the nearest settlement to Hawikuh when that village was inhabited, could be seen neither from the valley below nor from the adjacent heights. Hawikuh, therefore, necessarily must have been "the village now in view."

Mr. Bandelier's belief that K'iakima was discovered by Niza is, it appears, based mainly on tradition. Concerning the visit of Estévan to the Zuñis, two accounts have been recorded by Mr. Cushing,* each of which places the scene of the killing at K'iakima. The text of one of these stories is approximately accurate; the other maintains that the wise men of the Kâ-kâ order took Estévan "out of the pueblo during the night† and gave him a powerful kick that sped him through the air back to the south, whence he had come." A tradition so contorted by its authors that it bears but little semblance of its original form is worthy of serious consideration only in so far as it aids in establishing the maximum age at which the authenticity of Zuñi tradition ceases.

Regarding the seven cities of Cibola, also, tradition is seriously lacking. The early Spanish names of five of the towns are: Maçaquia (Matsaki), Coquimo (K'iakima), Aquico (Hawikuh), Canabi (T'kanawe or K'ianawe), and Alona (Halona). Thus far the identification is simple; but neither Mr. Bandelier nor Mr. Cushing has been able to identify satisfactorily the Aquinsa‡ mentioned by Oñate in 1598, while the Zuñi name of the seventh pueblo (the Spanish equivalent of which was never recorded) will in all probability never be definitely determined.§ It is quite apparent, then, that without the aid of Spanish records we would not know the names of any of the pueblos occupied by the Zuñis three centuries and a half ago (with the possible exception of Halona, the most recently occupied of the group), for the only names which the Indians are now able to give are those which bear close resemblance to the names preserved in Spanish records. Where these fail native tradition also fails.

* Arch. Inst. Papers, op. cit., p. 154.

† According to all the Spanish accounts, Estévan was killed in the morning while attempting to escape.

‡ Mr. Bandelier suggests Apinawa (= Pinawa); Mr. Cushing gives Ketchina with a query, and Kwakina in different writings. See Jour. Am. Eth. and Arch., vol. iii; Compte Rendu Congrès Int. des Amér., 7me. sess. (1888), Berlin, 1890; The Millstone, Indianapolis, April, 1884, p. 55.

§ Mr. Cushing has suggested both Hampassawan and Pinawa, the latter being Bandelier's Aquinsa. Bandelier (*Contributions*, op. cit., p. 171) mentions Ketchipauan doubtfully in connection with the seventh village.

In further illustration of the untrustworthiness of Zúñi tradition, especially when dating from such a remote period as the one referred to, it may be remarked that the Messrs. Mindeleff, while endeavoring to gather from the Zúñis traditional data regarding the coming of Coronado for use in connection with their archeologic studies in Zúñi and Tusayan, found that they were acquainted only with the Spanish version, and uttered statements concerning incidents of the march that Indians could have learned only from recent contact with whites acquainted with the Spanish history of the discovery. Again, the Zúñis claim to have preserved a tradition of a visit to them by Cabeza de Vaca before the "Black Mexican" came.* That such a story could have gained foothold in Zúñi only in recent years scarcely needs proof, for the question arose but twenty-five years ago, and since 1886 Bandelier has repeatedly and incontrovertibly proven that Vaca's route lay hundreds of miles away.

In view, then, of the untrustworthiness of Zúñi tradition, as above exemplified, can the persistent myth of the natives that K'iakima was the pueblo where Estévan met death stand in the way of such overpowering testimony to the contrary? Should the story of the negro who by a powerful kick was sped through the air back whence he had come—a story suspended by a single strand of truth—take precedence as historical evidence over the statement of Jaramillo, who visited Hawikuh with Coronado only a year later and specifically recorded that "here was where they killed Estevanillo," or of the declaration in 1626 of Fray Geronimo de Zarate Salmeron, who "mentions Hawikuh positively as the *Civola* of *Fray Marcos* and of *Coronado*"?† It is true Jaramillo wrote these words some years afterward; but would he have been more likely to err in such an important matter than would the unwritten story of the natives? Furthermore, Jaramillo is supported by Castañeda, who, in Mr. Bandelier's language, "makes no direct mention of the locality, but it is plain that he labors under the same impression." Such an important event in history as the scene of the murder of the actual discoverer of the "new country," the strange forerunner of civilization in the Southwest, the first black man the Indians had ever seen, could not have been forgotten in a year. Coronado, writing

* Haynes, *op. cit.*, p. 483.

† Bandelier, *Contributions*, *op. cit.*, p. 171.

from *Hawikuh* in 1540, says: "The death of the negro is perfectly certain, because many of the things which he wore have been found, and the Indians say that they killed him here."

In 1893 Mr. Bandelier's *Gilded Mun* appeared. Most unfortunately for the author, who was in South America at the time of its publication, the editing of the volume and the revision of the proofs were left to others, whose knowledge of Southwestern history was so scant that many errors were suffered to creep in. Among these is a statement, contradictory of all the evidence presented in Bandelier's previous writings, to the effect that Coronado did not go to *Hawikuh*, "fifteen miles southwest of Zúñi, the village nearest to him,* but to 'Oa-quima' [K'iakima], because [in the words of Jaramillo] the negro was killed there." I cannot believe that Mr. Bandelier would have allowed this statement to remain, since he has always declined as evidence the assertion of Jaramillo† concerning the village at which the negro was killed, on the ground that it was written years after his visit. If Mr. Bandelier's statement is intentional, then it further substantiates the evidence which I have above presented, that *Hawikuh* was the pueblo at which Estévan was killed, as the *Traslado de las Nuevas* (Col. Doc. Indias, xix, p. 529) will attest. This document maintains that on the 19th day of July (1540) Coronado went "four leagues‡ from this city [Granada] to see a rock where they told him that the Indians of this province had a stronghold, and he returned the same day." That the stronghold is the great rock mesa of Tâaiyalone, or Thunder mountain, on a knoll at the base of which stood K'iakima, needs no proof. It is the only impregnable height in the vicinity suitable for habitation, contains on its summit the ruins of defensive structures, is well known through direct statements in Spanish history under the name of the "Rock of K'iakima" as a place of refuge when the inhabitants of Cibola-Zúñi fled from their villages in the valley in fear of Spanish or Indian invaders, and, as approximately stated by the *Traslado*, is situated four

* Note the statement "the village nearest to him," which also must have been the village nearest to Niza and Estévan.

† "En pocos dias de camino llegaron à la primera poblacion de Cibola, adonde mataron à Estevanico de Orantes."—*Herrera, dec. VI, lib. ix, cap. xi, p. 205.* Y aqui mataron à Estebanillo el Negro, que habia venido con Dorantes, de la Florida, y volvía con fray Marcos de Niza."—*Jaramillo Relacion, in Col. Doc. de Indias, XIV, p. 303.*

‡ The distances given are somewhat underestimated.

or five leagues from Granada or Hawikuh—not K'iakima, which stood at its base.

Again, in the *Gilded Man* (p. 160), alluding to the mesas southward from Thunder mountain, from which, as Mr. Bandelier believes, Niza first caught sight of Cibola, occurs the reference: "There, too, the remains of a wooden cross were visible till a few years ago. It has been supposed that this was the cross which the monk erected; considering the dry atmosphere of the region, the supposition, even if it is not probable, is not to be wholly rejected."

My personal regard for the author refuses to make me believe that this statement is made seriously.* The fact that the friar was possessed of "more fright than food," and had been reduced to the extreme of necessity, precludes the thought that he remained on the spot longer than was necessary to break the limbs of a tree with which to form a cross† (its arms, in all probability, being secured by a shred of his cassock), and to heap around its base a pile of stones. Could even a more stable structure have stood the snows of three hundred and fifty Zuni winters? If a cross stood on this spot in recent times, we may more safely attribute its erection to the death by the wayside of some unfortunate Mexican, for such is the custom of his people.

That Hawikuh was the village first seen by Estévan, who there met death; that it was the "city of Cibola" rising from the plain which Niza and his Piman guides viewed from the southern heights in 1539, and that it was the pueblo which Coronado stormed in the summer of the following year, seems indisputable.

* It will be observed that Mr. Bandelier does not claim that he saw the cross, nor does he give the source of information. As no mention is made of it in any of his previous writings, I am inclined to believe that the reference is the work of the editor.

† "With the aid of the Indians, I erected on the spot a great heap of stones and placed on top a small cross, not having the tools necessary for making a larger one." (Niza, quoted by Bandelier: *Documentary History*, op. cit., p. 17.)

CLIFF RUINS OF CANYON DE CHELLY, ARIZONA

BY COSMOS MINDELEFF

Although Canyon de Chelly * is one of the best cliff-ruin regions in the United States, it is not easily accessible and is practically unknown. At the time of the conquest of this country by the "Army of the West" in 1846 and the rush to California in 1849, vague rumors were current of wonderful "cities" built in the cliffs, but the position of the canyon in the heart of the Navajo country apparently prevented exploration. In 1849 it was found necessary to make a demonstration against these Indians, and an expedition was sent out from Santa Fé under the command of Colonel Washington, then governor of New Mexico.

The expedition camped in Chin Lee valley, outside the canyon, and Lieutenant Simpson, who accompanied it and who was much interested in the archeology of the country passed over, made a side trip into the canyon itself. He noticed a number of ruins, and one, subsequently known as Casa Blanca, he described. This is the first and practically the only description we have until the field was entered by the Bureau of Ethnology in 1882. Although at least two visits were made to the canyon in the intervening years, nothing came of them, and Bancroft could find no better or fuller description than that of Simpson. The canyon was surveyed by the writer in 1883 and all the ruins located, and late in 1893 some study of the ruins themselves was made, upon which the following remarks are based.

The ancient Pueblo culture was intimately connected with and dependent upon the country where its remains are found. The limits of this country are closely coincident with the boundaries of the plateau region, except on the south—so much so that a map of the latter, slightly extended around its margins, will serve to show the former. Tsegi is almost in the center of this country, on the western slope of the Tunicha mountains, in northeastern Arizona.

On the east these mountains break down abruptly into the

* Commonly so termed. Its proper name, in Navajo, is Tsegi or Tsegihi.

broad valley of the Chaco. On the west they descend more gradually, through a series of slopes and mesas, into Chin Lee valley. The canyon has been cut by a group of small streams, which, rising near the crest of the mountains, combine near the head of the canyon, and flow in a westerly direction. The main canyon, known to the Navajos as Tsegi and to the whites as Chelly, is about twenty miles long, but it is joined near its mouth by a branch, coming in from the northeast, which is over fifteen miles long, so that there are practically two canyons. The second one is called by the Navajos Enatsegi, and on the maps Canyon del Muerto. There is another important branch, which joins the main canyon about thirteen miles above its mouth, coming in from the southeast. It is about ten miles long, and has been named Monument canyon. There are also numerous small branches, ranging in size from deep coves to real canyons one or two miles long.

The Rio de Chelly, so called, flows through the canyon, which forms its upper course, and after passing through Chin Lee valley discharges into the San Juan; but except at the time of the autumn rains, and in the spring when the mountain snows are melting, the streams are not powerful enough to carry water even to the mouth of the canyon, the flow being absorbed by the deep sand which forms the stream bed. Ordinarily it is difficult to procure even enough water to drink less than 8 or 10 miles from the mouth of the canyon, but occasionally the whole stream bed, at places over a quarter of a mile wide, is occupied by a raging torrent, impassable to man or beast. Such ebullitions, however, seldom last more than a few hours. Usually water can be obtained anywhere in the canyon by sinking a shallow well in the sand, and it is by this method that the Navajos, the present occupants of the region, obtain their supply.

The walls of the canyon are composed of brilliant red sandstone, discolored everywhere by long streaks of black and gray coming from above. At its mouth it is about 500 feet wide and the cliffs are only 20 or 30 feet high. Higher up the walls sometimes approach to within 300 feet of each other, elsewhere broadening out to half a mile or more, but everywhere the wall line is tortuous and crooked in the extreme, and while the general direction of Tsegi is east and west, the traveler on the trail which runs through it is as often headed north or south. Del

Muerto is even more tortuous than Tsegi, and in places one could almost throw a stone across it.

Near the mouth of the canyon the walls descend vertically to a wide bed of loose white sand absolutely free from talus or débris. Three miles above, at the junction of del Muerto, the walls are 200 feet high, but the rise has been so gradual as to be unappreciable; 13 miles above, at the junction of Monument canyon, the walls reach a height of over 800 feet, about one-third of which consists of slopes of talus and broken rock. The rise in the height of the walls is so gradual that the traveler who enters at the mouth of the canyon loses the mental scale by which distances and magnitudes are estimated, and the most ludicrous guesses result. At first he fails to realize the stupendous scale upon which the work was done, and when he does realize it he swings to the opposite side and exaggerates. An upright pinnacle or needle of sandstone at the junction of Monument canyon has been variously estimated at 1,200 to 2,500 feet high, although its base is less than 200 feet square; it is actually less than 800.

The rock of which the canyon walls are formed is a massive red sandstone in which the lines of bedding are almost obliterated. It is rather soft in texture, and has been carved by atmospheric erosion into grotesque and sometimes beautiful forms. In places great blocks have fallen off, leaving plane, vertical surfaces extending from the top almost to the stream bed, 400 feet or more in height and as much in breadth. In the lower parts of the canyon the walls, sometimes of the character described, sometimes with the surfaces and angles smoothed and rounded by flying sand, are generally vertical and often overhang, descending sheer to the canyon bottom without talus or intervening slopes of débris. Higher up the talus becomes more and more pronounced, generally taking up from one-fourth to one-third of the height of the cliff, the upper part of which is always bare, vertical rock. At only one place in either canyon can a horse be driven in or out, except, of course, at the mouth; but the Navajos have numerous foot-trails running over the bare rock, which slopes so sharply that they have to pick out little pits or holes for the hands and feet, and in one or two places they even drive flocks of sheep and goats over these trails; but such travel is a matter of habit and practice; certainly no man who wears boots would attempt it.

Near its mouth the whole bottom of the canyon consists of an even stretch of white sand, extending from cliff to cliff. A little higher up there are small areas of alluvium or bottom land in recesses and coves in the walls and generally only a foot or two above the stream bed. Still higher up these areas become more abundant and of greater extent, forming regular benches or terraces, generally well raised above the stream bed. At Casa Blanca ruin, seven miles up the canyon, the bench is 8 or 10 feet above the stream. Each little branch canyon and deep cove in the cliff is fronted by a more or less extensive area of this bottom land. Ten miles up the talus has become a prominent feature. It consists of broken rock, sand, and soil, generally overlying a slope of massive sandstone, which occasionally crops out on the surface. With the development of the talus the area of bottom lands dwindles, and the former encroaches more and more until a little above the junction of Monument canyon the bottom land is limited to narrow strips and small patches here and there. These bottom lands are the cultivable areas of the canyon bottom, and their occurrence and distribution have dictated the location of the villages now in ruins, as they have also the sites of all the Navajo settlements in the canyon. Only a very small proportion of the available land is utilized by the Navajos, and not all of it was used by the old village-builders.

Tsegi was until recently the great agricultural center of the Navajo tribe, and large quantities of corn, melons, pumpkins, beans, etc., were and are raised there every year. Under modern conditions many other localities now vie with it and some surpass it in output of agricultural products, but not many years ago it was regarded as the place par excellence. It will be clear, therefore, that prior to very recent times Tsegi would be selected as a stopping place by almost any tribe moving across the country, and, barring a hostile prior occupancy, would be considered the most desirable place for many miles in any direction for the pursuit of horticultural operations. The vicinity of the Tunicha mountains, which could be reached in half a day from any part of the canyons and which must have abounded in game, for even now some is found there, would be a material advantage. The position of the canyon in the heart of the plateau country and of the ancient Pueblo region would make it a natural stopping place during any migratory movement, either

north and south or east and west, and its settlement was doubtless due to this favorable position and to the natural advantages it offered. This settlement was effected probably not by one band or tribe nor at one time, but by many bands at many times. Probably the first settlements were very old; certainly the last are very recent.

The essential uniformity of types which prevails over the immense area covered by the ancient pueblo ruins is a remarkable feature, and any system of classification which does not take it into account must be considered as only tentative. What elements should be considered and what weight assigned to each element in preparing such a scheme is yet to be determined; but probably one of the most important is the character of the site occupied with reference to its convenience and defensibility. There are great differences in kind between the great valley pueblos, located without reference to defense and depending for security on their size and the number of their population, of which Zuni and Taos are examples, and the villages located on high mesas and projecting tongues of rock; in other words, on defensive sites, such as the Tusayan villages of today. Within each of these classes there are varieties, and there are also secondary types, which pertain sometimes to one, sometimes to the other, and sometimes to both; such are the cliff ruins, the cavate lodges, and the single-house remains.

The unit of pueblo architecture is the single cell, and in its development the highest point reached is the aggregation of a great number of such cells into one or more clusters, either connected with or adjacent to each other. These cells were all the same, or essentially so, for while differentiation in use or function had been or was being developed at the time of the Spanish conquest, differentiation in form had not been reached. The kiva, of circular or rectangular form, is a survival and not a development.

The differences between the largest examples of villages on defensive sites and the smallest appear to be only differences of size. Doubtless in the early days of pueblo architecture small settlements were the rule. Probably these settlements were located in the valleys, on sites most convenient for horticulture, each clan occupying its own village. Incursions by neighboring wild tribes or by hostile neighbors and constant annoyance and

loss at their hands gradually compelled the removal of their little villages to sites more easily defended, and also forced the aggregation of various related clans into one group or village. At a later period the same motive, considerably emphasized, perhaps, compelled a further removal to even more difficult sites. The Tusayan villages at the time of the Spanish discovery (1540) were located on the foothills of the mesas, and many pueblo villages at that period occupied similar sites. Actuated by fear of the Utes and Comanches, and perhaps of the Spaniards, the inhabitants moved to the top of the mesa, where they now are. Many villages stopped at this stage; some were in this stage at the time of the discovery—Acoma, for example. Finally, whole villages, whose inhabitants spoke the same language, combined to form one larger village, which, depending now on size and numbers for defense, was again located on a site convenient for horticulture.

The process sketched above was by no means continuous. The population was in slow but practically constant movement, much the same as that now taking place in the Zuni country; it was a slow migration. Outlying settlements were established at points convenient to cultivable fields, intended to be occupied only during the summer. Sometimes, these temporary sites would be found more convenient than that of the parent village, and it would gradually come about that some of the inhabitants would remain there all the year. Eventually the temporary settlement might outgrow the parent and in turn would put out other temporary settlements. This process would be possible only during prolonged periods of peace, but is known to have taken place in several regions. Necessarily hundreds of small settlements, ranging in size from one room to a great many, would be established, and, as the population moved onward, would be abandoned without ever developing into regular villages occupied all the year. It is believed that many of the cliff ruins belong to the same category.

The cliff ruins are a striking feature, and the ordinary traveler is apt to overlook the more important ruins, which sometimes, if not always, are associated with them. The study of the cliff ruins of Tsegi has led to the conclusion that the cliff ruins there are generally subordinate structures, connected with and inhabited at the same time as a number of larger home villages

located on the canyon bottom, and occupying much the same relation to the latter that Moen-kopi does to Oraibi, or that Nutria, Pescado, and Ojo Caliente do to Zúñi, and that they are the functional analogies of the "watch towers" of the San Juan and of Zúñi, the cavate lodges of the Rio Verde, the San Juan, and the Rio Grande, and the brush shelters or "kisis" of Tusayan; in other words, they were horticultural outlooks, occupied only during the farming season, and not continuously then.

It might be expected that the ruins of Tsegi, considering the topographic peculiarities of the region, would hardly come within a scheme of classification based on those found in the open country, and here, if anywhere, we should find corroboration of the old idea that the cliff ruins were the homes and last refuge of a race harassed by powerful enemies and finally driven to the construction of dwellings in inaccessible cliffs, where a last ineffectual stand was made against their foes, or the more recent theory that they represent an early stage in the development of pueblo architecture, when the pueblo builders were few in number and surrounded by numerous enemies. Neither of these theories are in accord with the facts of observation. The still later idea that the cliff dwellings were used as places of refuge by various Pueblo tribes, who, when the occasion for such use was passed, returned to their original homes, or to others constructed like them, may explain some of the cliff ruins, but if applicable at all to those of Tsegi, it applies only to a small number of them.

The ruins of Tsegi show several periods of occupancy, extending over considerable time. They fall easily into the classification suggested and exhibit various types, but the earliest and latest forms are not found. In a general way they may be classified as follows:

I—Old villages on open sites. II—Home villages on bottom lands. III—Villages located for defense. IV—Cliff outlooks or farming shelters.

I. In the upper part of the canyon and extending into what we may call the middle region, there are a number of ruins that seem out of place in this locality. They are similar to hundreds of ruins found in the open country, such, for example, as the older ruins in Tusayan, located on low foot-hills at the foot of

the mesa. The peculiar topographic characteristics of the location have not made the slightest impression on them. The ruins are located on gentle slopes, away from the cliffs, the foot-hills of the talus as it were, and are now marked only by scattered fragments of building stone and broken pottery. The ground plans are in all cases indistinguishable. In only a few instances can even a short wall line be traced. The villages seem to have been located without special reference to large areas of cultivable bottom, although they always command small areas of such land. There is a remarkable uniformity in ruins of this class, in character of site occupied, outlook, and general appearance. They are always close to the stream bed, seldom more than 10 or 12 feet above it, and the sites were apparently chosen without any reference whatever to their defensibility. In fact, they are often, if not generally, commanded by higher ground in the immediate vicinity. Although as a rule ruins of this class are found in the upper part of the canyon, one of the largest examples occurs in the lower part. At the junction of del Muerto, three miles above the mouth of Tsegi, a large mass of rock stands out alone and extends nearly to the full height of the canyon walls. On the south it is connected with the cliffs back of it by a low tongue of rock, sparsely covered in places by soil and sand, and on top of this tongue or saddle, which is of considerable area, there is a large ruin of the type described, but no ground plan can now be made out.

Possibly the obliterated appearance of this ruin and of others of the same class is due to the subsequent use of the material, ready to hand and of the proper size, in later structures. It is known that a similar appearance was produced in Tusayan by such a cause. The old village of Walpi, on a foot-hill below the mesa point, presents an appearance of great antiquity, although it was partly occupied so late as fifty years ago. When the movement to the summit of the mesa became general the material of the old houses was utilized in the construction of the new ones, and at the present day it might almost be said that not one stone remains above another.

If similar conditions prevailed in Tsegi there might be many more ruins of this class than those so far discovered. Even those found are not readily distinguished and might easily be passed over. Possibly there are small ruins of this type scattered over

the whole canyon bottom. At one place an example was found which shows no trace on the ground surface except some potsherds, which in this locality mean nothing. The site is a low hill or end of a slope, the top of which is perhaps 25 feet above the stream bed but separated from it by a belt of recent alluvium carpeted with grass. The hill itself was formed of talus, covered with alluvium, all but a small portion of which was subsequently cut away, leaving an almost vertical face 15 or 18 feet high. In this face the ends or vertical sections of several walls can be seen. One of them is nearly three feet thick and extends four feet below the present ground surface. Several other instances were found much resembling this.

The filling of these ruins to a depth of four or five feet and the almost entire absence of surface remains or indications does not in itself necessarily imply a remote antiquity, although it suggests it. During the fall and early winter months tremendous sand-storms rage in the canyon. The wind sweeps through the gorges with an almost irresistible power, carrying with it such immense quantities of sand that objects a few hundred feet distant cannot be distinguished. These sand-storms were and are potent factors in producing the picturesque features of the red cliffs, but they are constructive as well as destructive, and cavities and hollow places in exposed situations on the bottom are soon filled up. The stream itself is also a powerful agent of destruction and construction. During flood periods banks of sand and alluvium are often cut away and sometimes formed; yet there can be little doubt that the old village ruins on open sites, now almost obliterated, mark the first period in the occupancy of the canyon, perhaps even a period distinctly separated from the others. Excavation on these sites would probably yield valuable results.

II. Ruins comprised in the second class are located on the bottom lands at the bases of the cliffs and without reference to the defensibility of the site. They are, as a rule, much broken down, and might perhaps be classed with the ruins already described, but there are some distinctive features which justify us in separating them. Ruins of this class are always located either at the base of a cliff or in a cove under it, and sometimes at a considerable distance from the stream bed. The ground plans can generally be distinguished, and in many instances walls are

still standing, sometimes to a height of several stories. The ground plans reflect the character of the site they occupy, and we would be as much surprised to find plans of this character in the open country as we are to find plans of class I within the canyon. Unlike the ground plans of class I, these of this group were laid out with direct reference to the cliff behind them, and which formed, as it were, a part of them.

In point of size, long period of occupancy, and position, these villages were the most important in the canyon. The ruins often cover considerable areas, and almost invariably show the remains of one or more circular kivas. Sometimes they are located directly upon the bottom land; more often they occupy low swells next the cliff, rising perhaps ten feet above the general level and affording a fine view over it; sometimes they are found in alcoves at the base of the cliff, but they always rest on the bottom land, which extends into the alcoves and forms the floor. Ruins of the last-mentioned type merge insensibly into the next class, village ruins on defensive sites, and the distinction between them is partly an arbitrary one, as is also that between the last mentioned and the cliff ruins proper.

The largest ruin in the canyons is of this class. It is situated in del Muerto, on the canyon bottom, at the base of a cliff, and is known to the Navajos as Pakashi-izinni (the blue cow), probably from a pictograph of a cow, done in blue paint on the canyon wall back of it. Traces of walls extend over a narrow belt against the cliffs about 400 feet long and not over 40 feet wide. Over this area many walls are still standing, and scattered over the site are a number of large boulders. No attempt was made to remove these, but walls were carried over and under them, and in some cases the direction of a wall was modified to correspond with a face of a boulder.

About fifty-five rooms can now be made out on the ground, in addition to three kivas. There may have been altogether eighty-five or ninety rooms, but even this liberal estimate would give a population of only twelve or fifteen families, or, say, sixty persons. It seems, therefore, that, owing to the peculiarities of the conditions under which they lived and of the ground plan which resulted, one of the largest settlements in the canyon, extending over 400 feet in one direction, afforded a home to a very limited number of people. As it is probable that each family had

one or more outlooks, occupied in connection with their horticultural operations, it will readily be seen that only a small number of inhabitants might leave a large number of ruins, and that it is not necessary to assume either a large population or a long period of occupancy.

One of the most striking and most important ruins occurs in Tsegi, seven miles above the mouth. This is the ruin seen by Simpson in 1849, and subsequently called Casa Blanca; it is also known under the equivalent Navajo term, *Kini-na ekai*, or White House. At first sight this ruin appears not to belong to this class, or rather to belong both to this class and the succeeding one, villages located with reference to defense; but, as will appear later, it has nothing in common with the latter.

In its present condition the ruin consists of two distinct parts: a lower part, comprising a large cluster of rooms on the bottom land against the cliff, and an upper part, which was much smaller, occupying a cave directly over the lower portion and separated from it by a vertical cliff about 35 feet high.

The lower ruin covers an area of about 150 by 50 feet, raised a few feet above the bottom land by its own débris. Within this area there are remains of forty-five rooms on the ground and one circular kiva. On the east side there are walls still standing to a height of 12 and 14 feet. It is probable that the lower ruin comprised about sixty rooms, which, with a liberal allowance for the rooms in the cave, would make a total of eighty. This would furnish accommodations for a maximum of ten or twelve families, or a total population of fifty or sixty persons. It is probable, however, that this estimate is excessive, and that the total population at any one time did not exceed thirty or forty persons.

The principal walls of the lower ruin occur in the eastern part, where some of them are two feet thick and still standing to a height of over 10 feet. Wherever a wall rises to a height of more than one story the lower part is massive and the upper walls set back five or six inches, reducing its thickness by that amount. All the heavy walls occur either about the kiva or east of it, and this part of the ruin is directly under the cave above. The cliff back presents an almost smooth face, slightly overhanging, and on this face there are marks which show that formerly there were upper stories, the rooms of which are outlined upon it. The rock surface was coated in places with a thin wash of clay, doubt-

less to correspond with the other walls of the rooms, but this coating was necessarily omitted where the partition walls and roofs and floors abutted on the rock. Although the marks are now so faint as to be easily overlooked, at a certain hour of the day, when the light falls obliquely on the rock, they can be clearly made out. At one point the structure was three stories higher than it is now, and the roof was within four feet of the floor of the cave and under a gap or gateway through the upper front wall.

The kiva, which occurs nearly in the center of the lower ruin, was placed directly against the cliff. This is an unusual arrangement; but as the room walls in front of it are of a different character from those on the east, it is probable that originally it formed the margin of the settlement on that side and opened to the air.

West of the kiva there are remains of stone walls which differ in character from those on the east. They are 12 to 15 inches thick, and the lines are very irregular. South of the kiva, in the center of the ruin, there are other stone walls even thinner and more irregularly placed than those on the west, but most of the walls here are of adobe. As the use of adobe is not aboriginal, the occurrence of these walls is a matter of much interest, especially as they are so intimately associated with the stone-work that it is not always an easy matter to separate them.

Adobe walls are not found in subordinate positions, dividing larger rooms, except perhaps in one instance. Apparently this method of construction was employed when it was desired to add new rooms to those already built. No room constructed wholly of adobe can be seen, but adobe walls closing one side of a room are common, and such walls forming two or even three sides are not uncommon. There are instances in which part of a wall is stone and part adobe, and also instances in which the lower wall, complete in itself, is of stone, while the upper wall, evidently added at a later period, is adobe.

The mere occurrence of adobe here is evidence of the occupancy of this site at a period subsequent to the sixteenth century; we might almost say subsequent to the middle or end of the seventeenth century; but its occurrence in this peculiar way and in such intimate association with the stone walls suggests that the occupancy of the site was continuous from some time prior to the introduction of adobe until a period long subsequent to it. This

hypothesis is supported by other evidence, among which may be noted the occurrence of four chimney-like structures in this ruin, all constructed of adobe, and all, except the one pertaining to the kiva, attached to adobe walls.

The principal room in the upper ruin is situated nearly in the center of the cave and is the one which has given the whole ruin its name. The walls are of stone, two feet thick, twelve feet high in front, and seven feet high inside and on the sides. The exterior was finished with a coat of whitewash, decorated with a band of yellow. West of the principal room there is a smaller addition, which appears to have been added at a later period. The walls of this room are only about seven inches thick, of adobe on the side and back and of small stones in front. The coat of whitewash and the yellow band with decorations is continuous over both rooms, but the white coat was applied also to the exterior west wall of the main room probably before the smaller room was built.

In the western end of the cave there is a single or separate room whose front wall is eleven feet high outside and five feet inside. The lower portion of this wall is stone, the upper portion and sides are of adobe, and the side walls rest on nearly two feet of straw, ashes, etc. Against the front wall there is a buttress of stone, and the wall itself, which is slightly battened, rests on horizontal timber-work, a feature which is repeated in several walls in the main cluster.

The use of timber laid horizontally under masonry is not an uncommon feature in the ruins here, although it seldom accomplished the purpose designed. But the use of a buttress is an anomalous feature which it is difficult to believe was of aboriginal conception. Its occurrence in this ruin, together with so many other features which are either not aboriginal or doubtful, is suggestive.

With the exception of the principal room and the rooms in front of it, all the walls in the upper ruin are of adobe or have adobe in them. These walls in the upper ruin generally rest on the rock, sometimes on ashes and loose débris; in the lower ruin they rest generally on stone foundations.

The village ruins, containing each one or more circular kivas, were the home settlements of the people, inhabited at the same time that the cliff outlooks were in use. It is probable, from

evidence which cannot here be detailed, that some of them—the Casa Blanca, for example—were the last settlements to be abandoned in the canyon, and that this final abandonment took place long subsequent to the beginning of the historical period, probably considerably less than two centuries ago.

III. The third class of ruins, the remains of villages in the location of which more or less regard was paid to the defensibility of the site, comprises a large number of examples, including most of the very striking ruins in the canyons. There is no well-defined line between this and the preceding class, but between selected ruins of the two classes there is a wide difference. In a general way it may be stated that ruins of class II are always located on the canyon bottom or but slightly above it, while those of class III are never located directly on the bottom, but always at a greater or less elevation above it. There are some ruins of class III where, owing to the character of the site selected, access is now possible only with artificial aids, such as ropes and ladders. The number of these, however, is very few, not more than half a dozen in a total of one hundred and forty ruins, and there is no evidence that such aids were found necessary or were used by the builders.

The sites occupied by defensive villages are of two kinds: one consisting of sites in coves in the rock corresponding to the examples already described, but higher up and approached along a narrow bench or over slopes of bare rock; the other at the top of the talus. This division is artificial, however, and of no significance as regards the ruins. By far the greater number of ruins are located on the top of the talus, which often consists of a narrow bench or platform forming a convenient site for habitations and affording a commanding outlook over areas of cultivable land below it.

The best ruin of this class, and one of the largest in the canyons, occurs in the upper part of del Muerto and has been called Mummy Cave ruin. There are two caves, or more properly coves, in the rock, joined by a narrow ledge about 110 feet long. The western cove is about 100 feet across and 75 feet deep, and shows fourteen rooms on the ground. The connecting ledge shows ten large rooms, and the eastern cove, which is over 200 feet across and 100 feet deep, shows forty-four rooms and three or four kivas on the ground, the rooms occurring on a bench about 50 feet

wide. There may have been ninety rooms altogether, many of which could have been used only for storage. The total population may have been sixty persons.

The rooms occur on a ledge or bench running around the backs of the coves. There are no traces of a kiva in the western cove, which could be approached only from the eastern part, over the intervening ledge and partly through the rooms which occupied nearly all its surface. The eastern cove, which is perhaps 80 feet above the ground, is of easy access over a slope of *débris*. In fact, a burro carrying a pack was driven up to and into it.

The principal portion of the ruin is contained in the eastern cove. Many of the walls are still standing to a considerable height and exhibit a fair degree of skill in masonry. One of the kivas also is exceptionally well constructed. The rooms on the intervening ledge are exceptionally large and the walls are especially heavy. The structure was continuous and its eastern portion still stands to a height of three stories, carrying its roof intact. The walls to the west are broken down to one story, but marks on the cliff wall show the former existence of an additional story over part, if not all, of the ledge. The masonry of this part of the ruin is exceptionally well finished, but, strangely enough, the front wall and the tower rest on compacted sheep dung about half an inch thick, and many of the walls in the eastern cove rest on heavier deposits of the same substance. As sheep were introduced into this country by the Spaniards, the occurrence of these deposits under the masonry is important.

A fine example of this class of ruin occurs just below the mouth of *del Muerto*, on the north side of *Tsegi*. The cliff here is about 300 feet high and the ruin is located on a ledge in a cove about 70 feet above the stream bed. Although apparently very difficult, the ruin is of comparatively easy access without artificial aid. The strata within the pocket where the site occurs are inclined at an angle of about 45 degrees, and their edges have weathered out so as to form a series of little benches a few inches wide and tilted at an angle. By the exercise of some agility one can ascend along them.

The bench on which the ruin occurs is about 250 feet long and generally about 20 feet wide, the surface being almost flat. The structures are on the northern and the southern ends, but a considerable portion of the intermediate area was not occupied.

Many of the walls in the northern portion are apparently underlaid by a foot or more of ashes, sheep dung, and domestic refuse well compacted.

There were two circular kivas in the village, one of which was unusually small, being but ten feet in diameter, and benched in part only. The interior is coated with a number of washes of clay, applied one after another, and now forming a coating nearly three-quarters of an inch thick. This has fallen off in places, and in the section thus exposed eighteen coats, generally about one-thirty-second of an inch thick, can be made out. These coatings or successive plasterings are separated from each other by a thin film of smoke-blackened surface. This feature of successive coatings in kivas is quite common in the canyon.

The south end of the ledge was occupied by a structure whose use at first sight is not apparent. The front wall is very thick, slightly curved, and built partly over the sloping rock forming the back of the cove. There are no openings in it, although it still stands to a height of 5 feet above the rock. The structure measures 15 by 5 feet inside, one side being formed by the sloping rock. It is so situated that the sun shines on it only a few hours each day, and it seems more than probable that it was a reservoir, filled by carrying or lifting water from the stream below. This hypothesis is strengthened by the occurrence on the cliff wall back of the structure of pictographs representing tadpoles and other water symbols, which do not occur elsewhere on this site. This structure is especially interesting, as it is the only evidence found in the canyon of provision for the storage of water.

Near the center of the site there are remains of a small structure, apparently anomalous in the canyon. The bed-rock, which slopes slightly, has been removed over an area nearly 4 feet square, so as to leave a flat foundation, and on this there was a dome-shape structure about 3 feet in diameter, composed of mud and sticks, with a scant admixture of small stones. The walls were about 3 inches thick, and, from their slope, the structure could not have been over 3 feet high. They were composed of mud, held together by thin sticks or branches curved with the wall, apparently some kind of vine twisted together and incorporated in it.

If this structure was a dome-shape oven, and it is difficult to imagine it anything else, its occurrence here is important. It is

well known that the dome-shape oven, which is very common in all the Pueblo villages, in some being almost numbered by hundreds, is not an aboriginal feature, but was borrowed outright from the Mexicans. If the example described was used as an oven, it is clear evidence of the occupancy of these ruins within the historic period. No other structure of this kind was found in the canyon, however, and it should be stated that the ovens of the Pueblos are, as a rule, larger in size and constructed of masonry. There is a suggestion here, which is borne out by other evidence, that only the idea of these structures was brought into the canyon, without detailed knowledge of how to carry it out, as if, for example, they were built by novices from description only.

IV. Ruins comprised in the class designated as cliff outlooks or farming shelters are by far the most numerous in the canyon. They are located on various kinds of sites, but always with reference to some area of cultivable land which they overlook, and seldom if ever was the site selected under the influence of the defensive motive. The separation of this class of ruins from the preceding, village ruins, while clear and definite enough in the main, is far from absolute. The sole criterion we have is the presence or absence of the kiva, as the sites are essentially similar; but this in itself is a sufficient test. Settlements occupied only temporarily have no kivas, while those which were regularly inhabited must necessarily have had one or more. It might happen that the kiva would be so far obliterated as to be no longer distinguishable, but the number of cases in which this might have occurred is small. Moreover, the walls of the kivas, as a rule, were more solid and heavy than those of the dwellings, and in some cases have survived when the latter have almost disappeared.

Remains of this class comprised, as a rule, only one or two rooms; seldom as many as four. The masonry is generally good, sometimes excellent, and openings are arranged wherever convenience dictated. Often there is evidence of an enlargement or addition of one or more rooms at a period subsequent to the completion of the first structure. Some of the sites are 300 or 400 feet above the bottom; others not more than 10 or 12 feet. An example of the latter occurs at a point opposite the mouth of del Muerto. Here there is a large mass of rock connected with the cliff back of it by a low saddle, also of rock. The edge of

this rock, which may be 30 feet high, is bare and descends sheer or with an overhang to the bottoms or to the stream bed. On the western side, facing north, there is a little cave about 12 feet from the ground and overlooking a large area of cultivable land which lies before it. The cave is very small, but was divided by cross-walls into three parts. The back part is a completely enclosed space, dark, and not large enough to contain a human body, unless it was carefully packed in. The interior was wet and mouldy when examined (in winter), but in the summer time is probably dry enough.

The masonry is fair and the surface was finished with mud plaster. In front of the little back room there is an open space, divided by a wall into a smaller and a larger part. The roof of this space and the outer wall of the back room are much blackened by smoke, as though the inhabitant, for there could hardly have been more than one, cooked his food here and used the small room only to store his utensils and implements. The site is an ideal one for a lookout, but not well suited for habitation. There are numerous examples where, like this, the restricted area of the site precludes any possibility that they formed part of larger settlements since partly obliterated.

Many sites which bear unmistakable evidence of occupancy at some period are entirely bare of walls or wall remains; many others are marked by storage cists and burial cists of the Navajos. It seems probable that some of these were used just as they are now, the overhanging cliff affording such shelter as was necessary for the use to which they were put.

There are many interesting details and much evidence to support the hypothesis which has been advanced here, which cannot even be touched in this article. To properly present all the evidence would require much space. It is remarkable that, notwithstanding all that has been written about the cliff ruins, there is little direct evidence to support the hypothesis that they are defensive structures. Few, if any, examples can be cited which show anything that can be construed as the result or the effect of the defensive motive, except the general impression produced on the observer. Nor, on the other hand, do these ruins as a whole give any support to the theory that they represent an intermediate stage in the development of the Pueblo people. Some few do perhaps, but more than 99 per cent., if studied by themselves and without a reasonably full knowledge of modern

pueblo structures, would lead rather to the conclusion that they are the ultimate development of pueblo architecture, for they contain evidence of a knowledge of construction equal if not superior to that exhibited in many of the modern villages. The only thing anomalous or distinctive about the cliff ruins, considered as an element of pueblo architecture, is the character of the site occupied. If this were dictated by the defensive motive, it would seem that the same motive would have a further influence, affecting to some extent at least the arrangement of rooms or the character of the masonry, but there is no evidence of this.

An hypothesis as to the order in which sites of the various types of ruins were occupied cannot be based on the present condition of the remains. It is more than likely that the older ruins served as quarries of building material for succeeding structures erected anywhere near them, and probably some of the cliff ruins themselves served in this way for others. The Navajos have contributed their part to the destruction, for, notwithstanding their horror of contact with the remains of the dead, quite a number of buildings have been erected by them constructed of material derived from adjacent ruins; and it is evident that to gather this material would be a much lighter task than to quarry and prepare it, no matter how roughly the latter might be done.

In a study of the ruins of the valley of the Rio Verde made some years ago, a suggestion was made of the order in which ruins of various kinds succeeded one another, a sort of chronologic sequence, of which the beginning in time could not be determined. Studies of the ruins and inhabited villages of the old province of Tusayan (Hopi or Moki) and of Cibola (Zuñi) and a slight examination made of ruins on Gila river show that they all fall easily into the same general order. This order is somewhat as follows: 1. The earliest form of pueblo house is doubtful. As a rule, in most localities the earliest form found is already well advanced. As it is now known that the ancient Pueblo region was not inhabited by a vast number of people, but by a comparatively small number of little bands, each in slow but practically constant movement, this condition is what we would expect to find. It is probable that the earliest settlements consisted of single houses or small clusters located in valleys convenient to areas of cultivable land and on streams or near water. 2. The next step gives us villages, generally of small size, located on the foot-hills of mesas, overlooking areas of good land, which

were probably under cultivation. This class comprises perhaps more examples than any other, and many of these examples come well within the historic period. 3. In some localities, though not in all, the small villages were subsequently moved to higher and more inaccessible sites. This change has taken place in Tusayan in the historic period, and in fact was not completed even fifty years ago. The pueblo of Acoma was in this stage at the time of the Spanish conquest and has remained so to the present day. As a rule, each small village preserved its independence, but in some cases they combined together to occupy a high defensible site. 4. The final stage in the development of pueblo architecture is the large, many-storied or beehive village, located generally in the midst of broad valleys, generally near some stream, and depending on its size and population for defense. In this class of structure the defensive motive, in so far as it affected the choosing of a site, entirely disappears, although in general it was at this period that it exerted its strongest influence. The largest existing pueblo, Zúñi, made this step at the beginning of the eighteenth century. Taos, the next largest, was in this stage in 1541, and has remained so since. In some cases villages on foot-hill sites (2) have passed directly into many-storied pueblos on indefensible sites (4).

There is another step in the process of development that is now being taken by many villages which, although an advance from an industrial point of view, is degeneration to the architectural student. Many of the Pueblo Indians have built single houses in the valleys and on the bottom lands, wherever most convenient to the fields under cultivation, and this movement, which commenced but little over ten years ago, is proceeding at a steadily accelerating pace. Its ultimate result is of course the complete destruction of pueblo architecture as a phase of Indian culture, and whatever we wish to know of that architecture we must learn now, for two generations hence probably nothing will remain of it.

This hasty sketch will illustrate some of the difficulties which lie in the way of a complete classification of the ruins in the Pueblo country. It is impossible to arrange them in chronologic sequence, because they are the product of different tribes who at different times came under the influence of analogous causes, and results were produced similar in themselves but different in time. It is believed, however, that the classification suggested

exhibits a cultural sequence and probably a chronologic sequence within each tribe.

No mention of the cliff ruins has been made in this classification. These structures belong partly to the class of villages on defensive sites (3), but principally to a subclass which pertains more or less to all the classes. In the early stages of pueblo architecture the people lived directly on the land they tilled; later the villages were located on low foot-hills overlooking the land, but in this stage some of the villages had already attained considerable size and the lands overlooked by them were not sufficient for their needs. As a consequence, some of the inhabitants were compelled to work fields at a distance from the home village, and as a matter of convenience small temporary shelters were erected near the place of work. In a still later stage, when the villages were removed to higher and more easily defended sites, the number of farming shelters must necessarily have increased, as suitable sites which also commanded large areas of good land could not often be found. At a still later stage, when the inhabitants of a number of small villages combined into a single large one, this difficulty was increased still more, and it is in this stage that the construction of farming shelters received its maximum development. Often whole villages of some size, sometimes many miles from the home pueblo, were only farming shelters. These villages, like the single-room shelters, were occupied only during the farming season—not continuously, but periodically. In the winter the inhabitants abandoned them entirely and retired to the home village. Such is the practice also today.

It is significant that none of these subordinate villages possess a kiva. It is believed that the cliff ruins and cavate lodges, which are merely variants of each other, due to geological conditions, are simply farming shelters of another type produced by a certain topographic environment.

The absence of any attempt to improve the natural advantages of the sites used is remarkable, if we accept the hypothesis that the ruins were defensive structures. No expedients were employed to make access more difficult; the cavities in which the ruins occur are always natural; they are never enlarged or curtailed in the slightest degree, and very rarely is the cavity itself treated as a room, although there are some excellent sites for such treatment.

The settlements were always located with reference to the canyon bottom, and access was never had from above, notwithstanding that in some cases access from above was easier than from below. There are many instances where slight works on the approaches to sites would increase their defensive value a hundredfold, but such work was never done. Regarded as places of habitation, the cliff ruins are anything but ideal sites, and it would certainly seem that an influence strong enough to bring about the occupancy of such inconvenient and unsuitable sites would also be strong enough to bring about some modification in the architecture, such as would render more suitable sites available. Moreover, there is but one instance in the canyon, so far as known, where provision was made for the storage of water; yet without water the strongest "fortress" in the canyon could not withstand a siege of forty-eight hours.

There are many difficulties in the way of the hypothesis that the cliff ruins were defensive structures. If, however, we consider them farming outlooks, occupied during the farming season, and then only for a few days or weeks at one time, after the manner that such outlooks are used by the Pueblo Indians today, most of the difficulties vanish. The apparent inaccessibility of many of the sites disappears on close examination; and we must not forget, moreover, that sites really difficult of access to us would not necessarily be so regarded by a people accustomed to that manner of life.

Finally, as bearing on the antiquity of these ruins, it may be stated that there is good evidence of an occupancy within historic times, probably in the seventeenth and perhaps in the eighteenth century. Moreover, nearly every one of the clans who compose the Hopi tribe and who reached Tusayan from various directions and at various times, some within the historic period, claim to have lived at one time or another in Tsegi. Further, there is a tradition among the Navajos, now confined to a few of the old men, covering the occupancy of the canyon, and the ruins of Mummy cave, White House, and one other are pointed out as places where monks were stationed. To more than ninety-nine in a hundred Navajos, however, this tradition is unknown, and if asked what became of the dwellers in the cliffs they will say that a great wind arose and swept them all away. The wind failed, however, to sweep away the internal constructive and architectural evidence, which confirms the older tradition.

OBITUARIES**Robert Henry Lamborn**

In the *AMERICAN ANTHROPOLOGIST* for April, 1893 (volume vi, page 223), the following announcement appeared: "A member of the Anthropological Society of Washington has placed in the hands of the Treasurer of the Society a sum of money, to be awarded in prizes for the clearest statements of the elements that go to make up the most useful citizen, regardless of occupation." Later numbers of the journal contained announcements of the selection of a distinguished Board of Commissioners of Award, and of the awarding of prizes to two out of the forty-two essays received under the terms of the competition from seventeen states of the Union and five foreign countries. The name of the founder of the prizes was not given in any of these notices. It is a melancholy pleasure to announce that the founder was the late Dr. Robert H. Lamborn, of New York.

Robert H. Lamborn was born in 1836, near Kennett Square, Chester county, Pennsylvania. After acquiring a liberal education in this country he matriculated at the University of Geissen, in Germany, where he made special studies in mining and metallurgy and obtained the degree of Ph. D.; afterward he took a course in the *École des Mines*, Paris. Returning to this country in the early sixties, he engaged in railway business in Pennsylvania, and subsequently became interested in the construction of railways in southwestern states, and was an active promoter and large owner of the Mexican Central Railway. Through these enterprises he amassed a fortune, and later, on retiring from active business about 1887, devoted himself to scientific and literary studies.

For many years he was secretary of the American Iron and Steel Association, and his earlier publications were chiefly technologic; among them are "A Rudimentary Treatise on the Metallurgy of Copper," London, 1860, and "A Rudimentary Treatise

on the Metallurgy of Silver and Lead," London, 1861. Numerous editions of the latter work have appeared. His later years were occupied in travel and in study of a wide range of subjects; he was an indefatigable collector and generous distributor of material pertaining to the fine arts, history, ethnology, biology, geology, and mineralogy, and his donations have enriched the Metropolitan Museum of Art and the American Museum of Natural History in New York, the Museum of Archeology in the University of Pennsylvania, and other institutions, including the United States National Museum in Washington. His private library, numbering several thousand volumes, and certain special collections were deposited in the University of Pennsylvania. Through personal encouragement of investigation and through the establishment of funds, he did much to promote research concerning scientific subjects. He was connected with numerous learned societies. His later studies were devoted largely to art; his last important publication was a work on "Mexican Painting and Painters," New York, 1891.

Dr. Lamborn's business associations in earlier years and extensive journeyings in later years brought him in contact with all classes of men, and he became a keen student of men and institutions; and his opportunities, coupled with a kindly disposition, served to render him a philanthropist whose energy and means were devoted in large yet provident measure to the welfare of mankind. The anonymous founding of the Citizenship prizes of the Anthropological Society was but a characteristic incident of his career. Many such incidents might be noted, though there is reason to opine that most of his philanthropic acts were so modestly performed as to leave no record save in the minds of the widely dispersed beneficiaries. Industrious, energetic, and sagacious, Dr. Lamborn was a successful business man; amiable, upright, and generous, he was a useful member of society; in all ways he was a noteworthy contributor to the material and intellectual progress of the world. By constant activity throughout his adult life he contributed more to than he absorbed from his country, and was thus in himself a model of citizenship, and in his death the progressive nineteenth-century world lost one of its makers.

Dr. Lamborn died unmarried January 14, 1895; a brother and sister survive him.

W J MCGEE.

Franklin Austin Seely

A serious loss has befallen American anthropology in the death, at Washington, February 6, 1895, of Franklin Austin Seely, in the sixty-first year of his age.

Colonel Seely was born in Seelyville, Pennsylvania, April 4, 1834, graduating at Yale college in the class of 1855. During the war of the rebellion he was assistant quartermaster of volunteers, and was discharged in 1867 with the brevet rank of lieutenant colonel. In 1875 he entered the civil service as assistant examiner in the United States Patent Office. In April, 1877, he was appointed chief clerk of the office, surrendering the position, however, in June, 1880, to accept the appointment of principal examiner, having charge of the philosophical division, to which, upon his accession, was added the division of trade-marks. In 1887 the United States acceded to the International Union for the Protection of Industrial Property, and to Colonel Seely was assigned the task of reviewing the Convention of Paris. His interpretations of that technical convention have been universally accepted, both in this country and abroad. It may safely be said that the mind of Examiner Seely was the only one in this country which by previous experience and training was adapted to follow with clearness and precision the scope and significance of the many questions arising within the office or referred to it touching the international relations of these recon-dite property interests. During the terms of Secretaries Bayard and Blaine the Department of State frequently had occasion to seek the aid of his opinions. In recognition of his eminent fitness for the duty, Secretary Blaine, in 1890, designated him as a delegate from the United States to the International Patent Conference held at Madrid during the summer of that year. His writings on the international protection of industrial property and allied subjects for use before patent congresses and conventions have been widely distributed.

But it is in his researches in the fields of anthropology that the name of Colonel Seely is best known. While he was not a charter member of the Anthropological Society of Washington, which was founded in February, 1879, the records show him a member of the Board of Managers in the following year, and for

ten successive years he gave his best services to the Society as secretary to this working body of the organization. In this formative period of the Society's existence his trained faculty of analysis and investigation was highly instrumental in laying broad and strong foundations for the future growth of anthropology in this country. As a contributor to the proceedings of the Society, both in stated papers and in discussions, he was always ready, accurate, and convincing. His mind was eminently practical, and the realm of industrial technology opened to him an inexhaustible field of investigation. His treatise on "The Genesis of Inventions" will long remain one of the clearest expositions of the science of eurematics. The records of the Society show other papers upon cognate topics, such as that entitled "Time-keeping among the Greeks and Romans," a most felicitous monograph upon a hitherto little considered subject.

Versatile, accomplished, practical, wise, the pages of his busy life are marked with monuments of work in many fields faithfully done. The tribute of the Latin poet is eminently his: *Integer vitæ scelerisque purus.*

P. B. PIERCE.

Joaquín García Icazbalceta

Joaquín García Icazbalceta was born at the Mexican capital August 21, 1825, and died in his native city November 26, 1894. His father was Eusebio García, of Spain, and his mother a Mexican lady of Spanish extraction from the Vasque provinces. In the year 1829 his family came to the United States, where they remained for some time, and from there went to Spain, returning to Mexico in 1836.

Young Icazbalceta received very little education; his youth was spent mainly in his father's mercantile establishment, and most of his learning he gained at home. He early devoted himself to the study of the English language, and his peculiar aptitude enabled him soon to translate Prescott's "Conquest of Peru," to which he added an appendix bringing the history to date. Before this time, however, he published an analytical criticism of Prescott's work, under the initials F. M., in "El Album Mexi-

cáno," a work that reflected his rare talent for investigation and analysis and preëminent ability as an impartial and conscientious historian.

Señor Icazbalceta participated in the publication of the "Diccionario Historico y Geografico Universal," in ten volumes, the first of which appeared in 1852. His biography of Columbus has been highly commended, and his history of the press in America (it is well known that in Mexico the printing press was first established in the New World) is one of his most esteemed works, for he did not limit himself to the subject that the title implies, but wrote about the first publications that were made, their object, importance, destiny, and other biographic notices as curious as interesting.

His marvelous critical talent, coupled with rare judgment and notable sagacity, gave Icazbalceta a keen appreciation of the just value of the materials with which he had to deal, so that his store of knowledge was ever rich.

In 1858 and 1866, respectively, appeared the two volumes of his "Coleccion de Documentos para la Historia de México," a work well known for the rare value of its contents.

In the year in which the second volume of his collection of documents was printed he also issued from his own home (for he was collector, copyist, proof-reader, and in many cases typesetter) sixty copies of a rare little book bearing the title "Notes for a Catalogue of Writers in the Native Languages of America," which has been so well regarded by European and American scientists that it readily brings from twelve to fourteen dollars. It contains 170 pages, describing 175 works.

In 1875 Icazbalceta reprinted a book, first published in Mexico in 1554, containing three dialogues by Francisco Cervantes Salazar relating to historical events mainly in the city of Mexico. At the time of his death he was preparing a Mexican bibliography of the sixteenth century, besides a dictionary of Mexican provincialisms, of which latter work he left corrected proofs up to the letter *F* (about 800 pages). These two works alone are a monument to this indefatigable worker, who could not be an instant idle, and who often exclaimed when finishing a work: "I shall do no more; I am tired. This is the last that I publish!"

J. C. PILLING.

Charles Candee Baldwin

The subject of this sketch, the son of Seymour W. and Mary E. Candee Baldwin, was born at Middletown, Connecticut, December 2, 1834, but while an infant his parents removed to Elyria, Ohio, where his mother died in 1836. His father, remarrying, returned to Connecticut in 1847, but in 1856 removed again to Elyria. In 1855 Charles was graduated with honors from Wesleyan University at Middletown, entered Harvard Law School, receiving therefrom the degree of LL. B. in 1857. The same year he was admitted to the bar at Cleveland, Ohio, entering the offices of S. B. and J. F. Prentiss, which firm, after many changes, became in 1878 Baldwin & Ford.

As a lawyer Charles C. Baldwin stood high in his profession, and his career was marked by rapid and brilliant success. In 1884 he was elected judge of the circuit court, which position he retained until his death on February 2 last. Judge Baldwin was active in many educational enterprises, was at one time a trustee in two colleges, and was one of the founders of the Western Reserve Historical Society, being its president at the time of his death. His work in Ohio archeology extended over many years, and the published results of his research under the auspices of the Society of which he was a parent are widely known.

Judge Baldwin was actively connected with numerous institutions of learning throughout the continent, and was a corresponding member of the Anthropological Society of Washington for a number of years.

F. W. HODGE.

James Owen Dorsey

In the death of the Reverend James Owen Dorsey, at Washington, February 4, 1895, anthropology has lost one of its foremost and most promising workers in the domain of American linguistics and sociology.

By the collection and acquirement of facts knowledge is increased and thereby human culture is broadened. The intellectual triumphs of the race and the memorable events in history

are one and all intimately associated with the names of great and good men—men and noble workers in whom the divine and eternal are brilliantly reflected—who have wrought unselfishly to give them being. Of this band of noble workers one of the most modest, conscientious, and painstaking was James Owen Dorsey. Scientific research, through its numerous collaborators, is busy by day and by night, seeking to fathom the reasons of things and encouraging its workers to gather, systematize, and interpret facts and data whereby Philosophy may test her capacities in demonstrating them and the sum of human knowledge made greater. In the field of American linguistics and sociology Mr. Dorsey collected many facts and much data, which are a permanent addition to our heritage of knowledge.

It is due, perhaps, to this more than to any other reason that man intuitively offers to the memory of the eminent and illustrious dead the fadeless wreaths of commemorative tribute and eulogy, wrought from the buds and flowers of the worth, genius, and virtue of the departed. By this means are exalted the good deeds and noble aspirations of those most eminent in the various departments of human conduct, and the successes, triumphs over obstacles, and, it may be, reverses, of these men are made to teach others what to imitate and what to avoid, and to emphasize what may be regarded as their contribution to the welfare and culture of the race.

The subject of this brief sketch was born in Baltimore October 31, 1848. He acquired his primary education in the schools of his native city. At an early age he evinced a marked precocity in the acquirement of language by learning the Hebrew alphabet at six and by reading that language at ten years of age. During 1862-'63 he attended the Central high school (now City College), taking the classical course. When a member of the class of the second year illness constrained him to abandon his studies. In September, 1867, he entered the preparatory department of the Theological Seminary of Virginia, and the junior class in 1869. On Easter day, 1871, he was ordained a deacon of the Protestant Church by the Bishop of Virginia, and in May of the same year he began mission work among the Ponkas in Dakota Territory; but serious illness in July, 1872, and again in the following year, compelled him to abandon his mission work in August, 1873, which was soon after he had acquired the ability to converse with the Indians without an interpreter. Having returned to

Maryland, he was engaged until July, 1878, in parish work. Then, under the direction of Major J. W. Powell, he repaired to the Omaha reservation, in Nebraska, for the purpose of acquiring additional linguistic and other anthropologic material, remaining among this people until April, 1880. In the meantime, upon the organization of the Bureau of Ethnology in 1879, he was chosen one of its scientific corps, being up to the time of his last illness continuously and arduously engaged in linguistic and sociologic work. Subsequent to 1880 he made several field trips to Indian reservations, visiting, in addition to those of the Siouan stock, that of Siletz, on which he was able to collect important vocabularies and valuable grammatic notes and material pertaining to the Athapascan, Kusan, Takilman, and Yakonan stocks.

His grasp and comprehension of the principle of the genesis of words and the development of vocabularies is well and abundantly illustrated in his excellent paper, "Siouan Onomatopes," and in his Athapascan studies. In the forementioned essay is seen his complete mastery of a wealth of etymologic detail, which is marvelous even to the linguist. In his paper on "The Comparative Phonology of Four Siouan Tongues" we are introduced to a discriminating study of the phonologic wealth of the various dialects of the Siouan family. No one but a trained phonologist can appreciate the difficulties to be overcome in such a study.

His great modesty and his strong conviction that the views of a student should be moulded by facts prevented him from formulating subjective theories by which to judge the value of his facts. In the later years of his studies in linguistic morphology he began to feel the inadequacy of the venerable agglutination theory to explain all the facts of word-structure prevailing in the languages he was studying, and he came to look upon adaptation—the infusing with a new meaning or function an element which before had or had not any definite signification—as an important and potent factor in the genesis and development of morphologic structures. His mastery of the wealth of forms in the languages he studied enabled him to illustrate copiously the working of this principle. His linguistic acumen and painstaking accuracy are brought out in his interlinear translations of numerous and voluminous texts, both in print and manuscript.

In addition to numerous essays dealing with linguistic and other anthropologic matters which appeared from time to time

in various periodicals, Mr. Dorsey published under the auspices of the Bureau of Ethnology the following excellent and suggestive memoirs: "Omaha Sociology," "Osage Traditions," "A Study of Siouan Cults," "Omaha Dwellings, Furniture, and Implements," "Omaha and Ponka Letters," and "The Dhegiha Language, with Myths, Stories, and Letters." He also edited the "Dakota-English Dictionary" and "Dakota Grammar, Texts, and Ethnography" of the late Rev. S. R. Riggs, forming, respectively, volumes VII and IX of *Contributions to North American Ethnology*. At the time of his death he had completed a paper on Siouan sociology. Among the papers and articles of marked importance published in extra-governmental media may be mentioned: "Migrations of Siouan Tribes," with maps, in the *American Naturalist*, volume XX, No. 3; "Comparative Phonology of Four Siouan Languages," embodied in the *Smithsonian Report* for 1883; "An Account of the War Customs of the Osages," *American Naturalist*, volume XVIII, No. 2, and "Mourning and War Customs of the Kansas," in the July, 1885, issue of that magazine.

Although he published many essays in various media, by far the larger and most important part of the material collected and elaborated by him during the years of his active and successful career remains unpublished, but much of it is well on toward completion.

As a worker Mr. Dorsey was methodical, rapid, and untiring, accomplishing in a given time an amount of labor that was astounding in its extent and accuracy. His marvelous aptitude in discriminating, grasping, and retaining sounds enabled him to obtain with great ease accurate vocabularies and texts and to detect differences of meaning and function through differences of sound. His freedom from subjective theories, his deep erudition, and enlightened conservatism made him one of the foremost authorities in American linguistics.

By reason of the purity and unselfishness of his motives and the warmth and sunshine of his amiable nature, he won the esteem of all who had the pleasure of meeting him, and, being ever kind, affable, and cheerful to his colleagues, ever willing to aid and advise them, James Owen Dorsey was sincerely and cordially loved and revered by all.

J. N. B. HEWITT.

William Bower Taylor

Mr. Taylor was born in Philadelphia in 1821, and was a graduate of the University of Pennsylvania. He first practiced law in Philadelphia; was then an examiner and afterward librarian of the Patent Office. In 1878 he became connected with the Smithsonian Institution as editor of its publications. He was specially known as the editor of the scientific writings of Professor Joseph Henry; also by his work on Henry and the Telegraph. He was a well-known member of the Anthropological and Philosophical Societies of Washington. He died in Washington, February 25, 1895.

Mr. Taylor, although primarily a physicist, was widely informed on all the deeper topics of general science. His mind possessed a delicate sensibility to suggestion from others, and was influenced wholly by the inherent merit of the suggestion and not at all by the supposed competency or incompetency of the person making it. Still, on most questions he had settled convictions, and on nearly all important subjects he possessed original ideas, the result of prolonged independent thought. His conversation was particularly charming from the fact that it combined great learning and originality with the utmost simplicity and a complete absence of dogmatism. In a word, his entire character illustrated how extremely liberal genuine wisdom can afford to be.

LESTER F. WARD.

BOOK NOTICES

As to Copper from the Mounds of the St. Johns River, Florida, from Part II of Certain Sand Mounds of the St. Johns River, Florida. By Clarence B. Moore.

Taken in connection with his admirable and thorough treatise on the sand mounds of Florida, of which it forms so conspicuous a part, this chapter by Mr. Clarence B. Moore "As to Copper from the Mounds of the St. Johns River" is in certain essentials one of the most satisfactory and conclusive records of archeologic research that has been made during the year just ended.

As Professor Douglas furnishes a review from the standpoint of the metallurgist, and a clear statement of the main argument of the author, which is based upon chemical analyses of the ancient copper specimens in question, compared with analyses of other examples, both native and European, little remains to be said as to the final and authoritative nature, apparently, of this argument in proof of the aboriginal character of these Floridian and, presumably, of most other like mound remains of the copper art.

Since analyses of this sort are, however, deemed liable, despite every precaution, to mislead, unless supported by other data, it may be well in passing to call attention to the ample archeologic and technologic evidence with which Mr. Moore also supports his conclusions, by which, indeed, it is easy to believe he was first led to not a few of them. In the nature of such evidence are the observations carefully made and recorded by him indicating the primary and, generally speaking, prehistoric character of the mound burials with which these copper remains were found associated, and the still more significant fact that the latter not only bear trace of just such operations as I performed with stone and horn appliances in the experimental reproduction of ancient sheet-copper figures in native metal, but also that the rods of copper intended to be solid enough to serve as "piercers," etc., were made up of bits of the metal economically beaten very thin and rolled and hammered compactly together in a way

which I find would be impossible with brass of any grade or with the ordinary copper of commerce. This applies also and especially to the remarkable rivet-patched plates of large size figured and described by Mr. Moore. They are so obviously made up from small natural masses of copper beaten out, and thus, with minimum waste, as nearly as possible welded together by over and underlapping and the riveting to form solid plates of larger size than could have been shaped from any single piece the makers of them possessed, that one must needs infer, first, the purely aboriginal nature of the work as being that of artisans unacquainted with fusing or soldering; second, the very ancient character of this aboriginal work itself as having originated probably in the effort to use small nodules or bowlders of drift copper such only as was at first accessible to the mound-building Indians before they became acquainted with and worked in the great copper leads of the Lake Superior region, and such as they continued to use for a long time afterward, as indicated by the finds of Powell, Putnam, and other competent observers, even in far southern mounds and graves; and, finally, one must also infer the native origin of the extremely ductile and pure material used in such working, else piecing so perfect as to be unrevealed save by the most careful examination could not have been accomplished by such methods as are above mentioned.

Leaving other points which might, were space available, be noticed with equal propriety, it will suffice if I simply quote the general conclusions reached by Mr. Moore and comprehensively summarized at the close of his essay, and merely add that each claim made in this brief summary is satisfactorily supported by his more detailed studies bearing on or leading up to it, as set forth in the body of the work. These claims (and others less generally, but equally significant, might safely have been adduced by Mr. Moore) are, as stated by him, "after a careful survey of the field," as follows:

1. That the so-called copper found with objects of European make along the St. Johns and, we may add, in other portions of the United States, is almost universally not copper, but *brass*; and, conversely, that *brass* does not occur with original deposits of copper in mounds otherwise containing only objects of unquestioned aboriginal origin.

"2. That the workmanship on the copper of the mounds of the St. Johns is aboriginal.

"3. That the copper itself is of aboriginal production, the proof being mechanical, archeological, and chemical.

"4. That such being the case, if copper plates cannot be produced without recourse to annealing, then we must concede to the aborigines a knowledge of that art.

"5. That the copper of the mounds of the St. Johns is *native* copper, as shown by its high percentage of copper, a percentage not obtainable by early smelting processes, and by its freedom from arsenic and antimony in some instances, and the very small percentage in others of these impurities, which are found to a much greater extent in the early copper from the sulphide ores of Europe. In addition, lead, used in smelting processes of Europe and not eliminated from many of the ores, is present in earlier sheet copper, and is, without exception, absent from native copper and from the copper of the mounds.

"6. That the Florida copper may have been derived from various sources, possibly in part from Mexico, New Mexico, or Arizona, and probably to a certain extent from Cuba,* but that the main supply was obtained from the Lake Superior region, most of whose copper is non-arsenical.

"7. That copper in which silver is visibly present has, so far as is known, for its only source of supply on this continent the Lake Superior region.

"8. Incidentally, that mound copper from other localities, including the copper of the famous Etowah plates of Georgia and of the no less well known Hopewell mounds of Ohio, is, like the Florida copper, aboriginal, having nothing in common with the products of the impure European sulphides and imperfect smelting processes of the fifteenth, sixteenth, and seventeenth centuries."

It would be advantageous, I think, to take this work of Mr.

* This discovery of Cuban copper in the Floridian mounds is of great importance, as bearing also on possible trade relations of the aboriginal inhabitants of Florida and the Mississippi valley, not only with the inhabitants of Cuba, but also, though perhaps indirectly, with those of Yucatan, for I am now inclined to believe (from evidence which has come to hand since my paper on "Primitive Copper Working" was published in the *ANTHROPOLOGIST* of January, 1894) that such far-reaching trade relations did exist, and that to some slight extent they influenced the arts of both these metal-working peoples.

Moore's not only as a model of its kind, but also as a precautionary example, in our studies of other questions still more or less mooted ; such, for instance, as the occurrence of art products or symbolic designs supposed to be too highly developed to have originated solely with our aborigines or from their resemblance to certain products of old-world art and culture regarded as derived therefrom. It seems not unlikely—and the present work marks a decided step in this direction—that we must ere long, as heretofore urged by such authorities as Major Powell and Dr. Brinton, concede the entire independence in general of American cultures. That the institutions and arts and even the minor art products in the main, no less than the languages of our indigenous tribes, have developed here and alone. It may be true that at many points these native tribes have been touched ; that there may be found here and there traces—mere waifs—of old-world things among their ancient remains. Yet, even so, this has nowhere given rise to a single new art or, until within the last century or two, modified to any considerable extent an old one. Its influence could have been but superficial at best, so evanescent, unless continuously exerted, that in no place can its presence in effects be positively affirmed to the satisfaction of all discriminating inquirers ; such influence, indeed, having wrought only seeming changes beyond mere externals, even within recent times, on such peoples as the Pueblos, whose cultural moods and art usages remain practically unchanged by all its intermittent pressure through full three centuries. Yet, notwithstanding all this, these questions of foreign influence are, on one plea or another, continually being brought forward to the detriment of true progress toward their solution either one way or the other.

Now, it is to just such work as this of Mr. Moore's that we are to look for the evidence we need for putting these contested questions to rest, for it is evident from a perusal of the pages of his work as a whole that he started out without prejudice or predilection, simply from honest interest, and at first merely as a follower in the footsteps of his eminent predecessor, Dr. Jeffreys Wyman ; but that he soon cut a trail for himself through quite unbroken ground, and has ended by making of this simple trail a finished highway, over which we may all travel easily and safely to very definite destinations.

F. H. CUSHING.

Tenth Annual Report of the Bureau of Ethnology: Washington, 1893.

This volume is devoted to the picture-writing of the American Indians, and is the crowning work of Colonel Garrick Mallery's life. It is very seldom that a man in contemplating his studies may say on laying down his pen, they are finished.

Colonel Mallery's observations on pictography and sign language began simultaneously during his military service among the Dakotas. He then formed the hypothesis that gesture-speech, though never exclusive of oral speech in the expression and transmittal of ideas, was developed into fitness for general and practical use among early men before oral speech had advanced so as to form a system. This is paraphrased, that at a supposed period in the history of man gesture-speech often was used independent of oral language, when among the same men oral speech was inadequate without concomitant and explanatory gestures. The gestures were at first purely ideographic, when not merely pantomimic; of course they were transient, and the attempt to make them durable for records, notices, messages, etc., was by ideographic markings and devices—i. e., pictographs. This hypothesis was strengthened by observing some glyphs bearing skeleton outlines of gestures with apparently the same significance as that which the gestures indicated. The supposed era therefore produced, by gestures, idea-speaking, and, by pictographs, idea-writing. When oral language advanced it was much more conventional, the sounds being far less than gestures, directly expressive of ideas; indeed, except in a few cases of onomatopoeia, the sense cannot be deduced from the sound. Written syllabaries and alphabets, being applied only to designate sounds, were still more conventional and may be styled sound-writing as contrasted with picture or idea writing; yet the devices used in syllabaries and alphabets to express sound were often the same which had earlier been used in pictographs, and thus had become familiar. The observed facts suggested that in picture-writing of North American Indians and other races the beginnings of our modern manuscripts and principal books were to be found. This cause of observation and reflection led to the studies presented in this volume, in preparing which, however, collateral matters came into view.

In the explanation of these views Colonel Mallery has with great diligence for many years ransacked the earth for material, and it is presented in the book before us in a very practical form. The author, having devoted a great deal of attention during his early years to literary matters, gives the reader the benefit of his style in the text.

The author's modesty is also apparent, since it would be impossible to find the first personal pronoun, except as a quotation, in all these pages. Another literary feature of the book which commends itself is the absence of foot-notes and obtrusive references of authorities. The authors quoted, together with their works, are given in an appendix and referred to in the text by convenient numbers. It is for the reader to decide whether, in thus giving to the book a more tasteful literary form, the author has not put the reader to considerable trouble in referring backward and forward from text to list.

The plan followed by Colonel Mallery is not without precedent in the volumes of very distinguished authors. Colonel Mallery has also wisely abstained from philosophizing too extensively in this work, which is rather a descriptive than philosophic production. The enormous mass of material gathered together will make it possible for those who take up the subject in the future to draw any conclusions they may please therefrom.

In the prompt publication of this material the Bureau of Ethnology has not only done the world a favor, but built a lasting monument to Colonel Mallery, who had scarcely laid down his pen ere he was called away from his earthly labors.

O. T. MASON.

The Tusayan New Fire Ceremony. By Dr. J. Walter Fewkes. Hemenway Expedition. Proceedings of the Boston Society of Natural History, vol. xxvi, pp. 422-458.

Dr. Fewkes has given in this paper a very satisfactory account of the "new fire ceremony" of the Hopi. While a great deal has been written upon the occurrence of this world-wide ceremony in other countries it has been only cursorily noticed in America. Here it has survived, perhaps, in a fragmentary state

in the Green Corn dance of many tribes and the White Dog feast of the Iroquois; but among the Pueblos has been semi-dramatized and surrounded by an amazing liturgy, which taxed Dr. Fewkes' endurance to follow.

Curiously the Hopi ceremony is followed by the casting away of the fire and not by its distribution to the domestic hearths, as is usual.

The modesty of Dr. Fewkes in generalizing from his careful observations of this ceremony is worthy of emulation. There seems, however, from the bringing in of the Dawn Woman and the God of Germs, sufficient basis for concluding that the Hopi had perceived the analogy between fire and life or germination and its relation to light or dawn, as did the Vedie Aryans.

WALTER HOUGH.

NOTES AND NEWS

THE SNAKE CEREMONIALS AT WALPI.—I have recently had the pleasure of reading Dr. Fewkes' admirable presentation of the snake dance of the Moquis,* and perhaps no higher compliment could be paid the author than to say that he made the fullest use of his advantages, which latter I understand were largely due to the munificence of that noble-hearted patroness of American anthropology, the late Mrs. Mary Hemenway. But while passing over page after page of this most interesting monograph it was impossible for me not to keep in mind the wonderful increase, and the very intelligent increase, of popular interest in all that relates to our aborigines since my first acquaintance with our southwestern tribes, twenty years ago.

When I first saw prayer-sticks and stone prayer-heaps in 1870, and a little later when it was my good fortune to be admitted into a kiva, the impression became strong within me that the Moquis were truly a curious people, well worthy of study, and just as deserving of our attention as they were of that which Brigham Young was giving them.

Nearly ten years had elapsed before my next visit to the Moqui country, where it was my great good fortune to be the first white man to attempt to describe the weird rite of the snake dance. Although the country had been materially encroached upon by civilization (for newly constructed railroads terminated within less than two hundred miles of Keam's ranch), the dense crust of our ignorance had not yet been broken. A few adventurous spirits had penetrated to Zuni and the adjacent country, confident that there was much to be discovered and described; among these were Joseph Wasson, long since dead; C. E. Cooley, Charles Franklin (who lived in Zuni for several years), James Stevenson, of the Bureau of Ethnology; Dr. Washington Matthews, and Mr. F. H. Cushing. But the equipment of all these men was wretchedly inadequate, and public opinion not infrequently regarded them as uncanny. My own scientific outfit,

* Journal of American Ethnology and Archæology, vol. iv.

when I started to investigate the snake dance of 1881, consisted of a couple of lead pencils and a pad of paper. If ever chill penury repressed noble rage it was in those days, which we may now happily call the early days of North American anthropology.

Yet it is to such dauntless spirits as the late Lieutenant General Philip H. Sheridan, Major General George Crook, Major John W. Powell, Lewis H. Morgan, Dr. Francis Parkman, Dr. E. N. Horsford, George Peabody, and others of that class that North American anthropology owes its rise upon the basis of exact, painstaking observation in the houses of the aborigines themselves. Today American anthropologists are receiving appreciative attention from scholars in the old world, who recognize that all observations of primitive society now made on our side of the ocean are more or less applicable to what primitive society must have been centuries ago in Europe and elsewhere.

From the appearance of my own work on the snake dance interest in the subject grew apace, the horizon of investigation widened, and there are now in existence as many as five hundred descriptions of the ceremony, written by more or less competent hands and with more or less exactness, but each of them more reliable and more vivid than any description of ophiolatry which have come down to us from ancient times.

Dr. H. C. Yarrow, U. S. A., made a journey to the snake dance of 1883 especially to determine the noxious or innocent character of the snakes employed, and later Mindeleff did the same thing, Dr. S. Weir Mitchell, of Philadelphia, an authority on the subject, lending his assistance. The late Mr. James Stevenson passed some days or weeks among the Moquis and brought from them everything in sight, especially all that he could induce them to part with, which had any connection with their religious or festive observances. Major-General McCook, U. S. A., took in a large party of army officers and others in 1891, and Mr. Lundgren, of Cincinnati, after long and critical study upon the ground, writes me that he is now almost ready to begin his life-size painting in oil of this perhaps the greatest of our surviving sacred dramas.

Great as has been the work accomplished, it is not yet perfected. Connection must be established between the Moqui form of the snake dance and any variants which may exist, as I am inclined to suspect they do still exist among the people of

Acoma, Sia, Jemez, or Zufi, as well as among the Mohave and Apache. It will be of interest to note that the Apaches took me to their sacred caves in the Pinal range and the Sierra Ancha, and on the way we stopped at and prayed to stone heaps exactly like those described by Dr. Fewkes (p. 41). In these caves the Apaches showed me phallic symbols in stone, and pointed out where their medicine-men stood with naked feet and danced about among rattlesnakes. They also asserted that their medicine-men would take little rattlesnakes in their mouths and swallow them. Incredible as this may seem, it is strictly in line with what has been related of the Aztecs by early Spanish authors.

Having thoroughly worked up the American field, it will be in order to examine into all that obtains in Whydah and Nagpore and among the fanatics of Arabia.

It would be interesting to know whether the Moquis attach any significance to the sinistral or the dextral ceremonial circuit around the sacred rock. The Celtic Druids certainly did. It is even stated by some scholars that the Irish word for "pilgrimage" means to march around a rock, from the number of "holy stones" once so abundant in Ireland. When the Druids wished an incantation to be beneficent they marched in procession with the sun—*i. e.*, to the right; if it was to be maleficent they marched to the left.

The use of honey in religious ceremonial (p. 46) inspires the question: Is there any account of the use of maple sugar in the same manner by the tribes of the Atlantic coast? What analogy, if any, is there between this and the use of sugar by the Thugs of India when offering sacrifice to the Goddess Kali or Bhowani previous to strangling a victim?

The Ko-ho-ni-no or Havasupai, mentioned by Dr. Fewkes (p. 51) as bringing presents to the Moqui at the snake dance, brought, among other things, "a water-worn root of a cottonwood tree several feet long, which grew in the Grand canyon, on the banks of the Colorado river." We are not told what this particular gift meant, and it would be unreasonable to ask for an explanation at a moment when the fullest attention was necessarily concentrated upon more important matters. The Havasupai have close commercial and some slight marriage relations with the Moqui. I found an old, blind Kohonino living and married in

Oraibi in 1881. When I went down into Cataract canyon every family of the Havasupai had Navajo blankets, procured in trade from the Moqui. They used to take over skins of the mountain lion, an animal held in veneration scarcely inferior to that accorded the snake or the bear.

The Mohaves told me, and they told also Colonel Peirce, who was their commanding officer, that they originated at *Cottonwood island*, in Colorado river, some distance above Fort Mojave, near the mouth of the Rio Virgen, where they used to get salt.* They claimed kinship, more or less close, with the Yuma, Pima, Papago, Cocopa, Opata, and Walapai, and said that long, long ago they were related to the Moqui. A peculiar feature of their legend was that the leader who conducted their forefathers down Colorado river to its mouth and beyond bore the name Ku-ku-mat, which is suspiciously like Gu-cu-matz, the cultus hero of the Guatimaltecs.

In Havasupai canyon I found attached to the rock wall of a little spring dripping out of the face of the precipice several feather prayer-sticks exactly like the poles of the Moquis (p. 51). Dr. Fewkes was careful to note that the piece of cottonwood root presented by the Kohonino "was made into a cross-shaped prayer offering," a pretty sure indication that it was accepted with particular gratitude and veneration.

The Moquis took pinches of sand from their sand-altars and carried them to their fields (p. 95), undoubtedly to secure blessings upon the crops. The Apaches and the Indians of Guatemala did almost the same thing in curing the sick or casting the horoscope of a child.

In the purification of the snake priest we read that "Kopeli filled his mouth with the mixture, went to the priests as they squatted on the floor, and forcibly squirted the liquid from his mouth upon their breasts, arms, and legs, where the decorations once were. When each person had been treated in this way he rubbed his arms and breast with his hands and then put on his ordinary clothing" (p. 97). Why did Ko-pe-li do this? The Sioux medicine-men did the same thing to the victims at the sun dance, and it may be learned that very nearly the same

* See "Notes on the Theogony and Cosmogony of the Mojaves" in *Journal of American Folk-Lore*, 1889.

methods are followed by the Mexicans of the lower Rio Grande to avert the effect of the evil eye.*

A typographical error on page 120, the only one I noticed in this beautiful monograph, makes Mr. James G. Frazer, of Trinity College, Cambridge, the author of "The Golden Bow." Mr. Frazer's work is "The Golden Bough," a work which every American student might read with pleasure and profit.

JOHN G. BOURKE,
Captain, United States Army.

IMPERIAL RUSSIAN GEOGRAPHIC SOCIETY.—In 1892 there died in St. Petersburg the Grand Duke Constantine Nicolaevitch, brother of Emperor Alexander II, the founder of the Imperial Russian Geographical Society and for nearly fifty years its president.

The plan of forming this society was first presented by him in 1845, at a small gathering of prominent scientists, in his private apartments at the Winter Palace. From its very beginning the society was not wanting in experienced leaders, for among its founders were the distinguished Russian navigators Litke, Krusenstern, Riccord, and Wrangel; the distinguished Russian savants in the various branches of natural science Baer, Struve, and Helmersen; the statisticians and ethnographers Arseniev, Keppen, Levshin, and Dabil, and such distinguished government officials as M. N. Monravief and V. A. Perovski.

The young prince took a very active interest in the success of the society, which never flagged during the forty-eight years of his connection with it. After his death the society expressed the wish to have a member of the imperial family for president, and the Emperor appointed the Grand Duke Nicola Michailovitch to this office. The list of membership on the 1st of January, 1892, included 15 members of reigning families, 22 Russian honorary members, 6 foreign members, 21 patrons, 662 active members, 213 contributing members, and 30 correspondents.

During the last year the membership has reached a thousand.

* "Popular Medicine, etc., of the Rio Grande" in *Journal of American Folk-Lore*, 1894.

The Imperial Russian Geographical Society has four great divisions, each of which has its own chairman. The branches are mathematical geography, physical geography, ethnology, and statistics. The work is carried on separately in the different sections of the empire; for example, there is the section of Eastern Siberia, of Orenburg, of Western Siberia, of the Caucasus, etc. Quite recently a new section has been formed—that of the Amoor country.

A number of publications are issued yearly by this society, the principal ones being the bimonthly *Geographical News*, *The Living Past* (division of ethnology), published quarterly; the *Meteorological Journal*, and annual reports. There are also reports of the various sections and of the work of expeditions, of which there were twenty-two in 1892. A *Bibliographical Index* has also appeared, as well as *Programs* and numerous maps.

The society distributes yearly a number of medals for the most important contributions. Chief in importance among these is the large gold medal of the Grand Duke Constantine; another bears the name of Count Litke; still another gold medal, bearing the name of Peshevalski, is awarded annually by the division of ethnology.

JULIE MINDELEFF.

THE BEEBE RESEARCHES.—Major William S. Beebe, of Thompson, Connecticut, has published privately seven portfolios of views and tables illustrative and descriptive of various subjects in American archeology to which their compiler has been devoting much research. The text which these portfolios are to accompany is now in preparation. The titles of the parts are as follows: I, General views, Peru, Bolivia. II, Great Dial, Tiahuanacu, Bolivia; Cosmic theory of primes. III, Series exhibiting the influence of the Tia-huanacu dial in both the Americas. IV, American inscriptions; Mithraic tablet (obverse), Davenport, Iowa. V, American inscriptions; The Pemberton axe, The Piqua tablets, Primitive alphabetical types—(advance sheets). B, Numerical evidence in favor of the wide distribution of the theory of primes (plates). B, part 2, The Mithraic tablet (obverse), found at Davenport, Iowa. Major Beebe has generously contributed a set of these valuable portfolios to the Anthropological Society.

ADELE M. FIELDE, in "A Corner of Cathay," recently issued, gives the following interesting account of Chinese folk-lore :

"When a child is just one month old the mother, carrying it in a scarf on her back, induces it to look down into a well. This is supposed to have a mentally invigorating effect, producing courage and deepening the understanding. The infant is always fed from a large bowl to make it a big eater. A bride may be taken to her husband's house while a coffin is therein, but not within one hundred days after it has been taken out, or domestic troubles will surely follow. Moreover, the bride may not, during the four months after her marriage, enter any other house in which there has recently been either a death or a birth without precipitating a quarrel with the groom. If a fly falls into the porridge it heralds the coming of a guest, while a cock's crow between sunset and midnight betokens death in its owner's family. It is not respectable for an old man to go without a beard or for a young man to wear one. A sneeze indicates that some one is thinking of you."

Mr. GEORGE F. BLACK, assistant keeper of the National Museum of Antiquities, Edinburgh, has in preparation a work dealing with "Scottish Charms and Amulets," to be published by Mr. George P. Johnston, Edinburgh. Mr. Black is desirous of making the work as complete as possible, and will be grateful to any one for information of such Scottish charms or amulets as have not hitherto been described. All assistance given will be acknowledged in the work.

ERRATUM

In the article on the Micmac Indians, page 37 of the January number, the statement that the rattle-altars were found in Yucatan should be read as found in Mexico.

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THE GOD "D" IN THE CODEX CORTESIANUS *

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In his most valuable contribution to the study of Mayan codices Dr. Schellhas ('86, *passim*†) has suggested a nomenclature for their pictures of gods most advantageous in the study of their symbolism and worthy the recognition given it by the foremost students of Mayan pictography. He proposed to designate the figures of deities in these aboriginal "books" by the letters A, B, C, D, etc. Following that nomenclature, the pictographs considered in this article are those referred to D, taken from that fragment of the Codex Tro-Cortesianus called the Cortez codex. The resemblance of D to B and G has led me to discuss all three together, although G does not occur in Codex Cortesianus, as I regard them all related gods. I shall preface what I have to say of D with a brief reference to B, which I have already considered elsewhere ('94).

B—Long-nose God.

This god, identified by Schellhas as Kukulcan, by Brinton as Itzamná, has snake and rain attributes, as already pointed out, and is associated with symbols of all four cardinal points. It is a beneficent deity, and is never represented as hostile or as a captive. He frequently occurs engaged in planting, and in some instances bears one or more torches, suggesting a god of light, as the sun. The symbolism of his mask or ceremonial helmet I have already pointed out, and need not be repeated. As, however, one of the marked peculiarities of B in Cod. Cort., which

* In justice to the author, the editors desire to say that owing to his absence in Arizona it was not possible for Dr Fewkes to read the proofs of this paper.

† See bibliographic references at the end of this paper.

was there emphasized, appears to have been overlooked in a subsequent publication of a recent writer, I will again refer to this character. "The god B," says Brinton ('95, p. 51), "is associated with the signs of the east, and his especial and invariable (*sic*) characteristic are two long, serpent-like teeth, which project from his mouth, one in front, the other * to the side and backward." As I have elsewhere ('94, p. 263) shown in my criticism of Schellhas' diagnosis of B, the so-called portion of the tongue ("serpent-like tooth," (?) Brinton), in front † of the mouth is not an invariable characteristic of B, but is always (in the shape referred to) absent in Cod. Cort., and, I will now add, in Cod. Tro. as well. In Cod. Dres. it is likewise often wanting. Although I find it somewhat difficult to *prove* from Cod. Tro-Cort. alone that B is a sun god, the symbolism and association of figures of him in Cod. Dres. lean, no doubt, on this point.

As I have already ('94, p. 272) pointed out, the features which distinguish the god D from B in Cod. Cort. are the absence of the teeth in the upper jaw and the want of a backward curving oral object or appendage of the mouth. The remainder of the mask or ceremonial helmet, ‡ with unimportant variations which are not constant, is similar in the figures of the gods B and D.

* The homology of this object, identified as part of the tongue by Schellhas and called tooth by Brinton, is doubtful. It occurs in figures of certain animals, serpents, and quadrupeds, where its homology with a tooth is doubtful.

† Brinton is also mistaken in ascribing the second figure of his fig. 14 ('95, p. 53) to the Dresden codex. He evidently copied this from an erroneous one by Schellhas ('86, taf. III, fig. 7), which was rightly referred to Cod. Cort., p. xi b, by the latter author. As I have elsewhere ('94, p. 263) shown, this copy is erroneously drawn, for the "part of the tongue" (Schellhas), "tooth" (Brinton), in front of the mouth has been modified as compared with the original, which it little resembles. Brinton's fig. 12 ('95, p. 52) of B has the union of the lateral "tooth" with the upper jaw inaccurately copied. This faulty figure is a copy of B from Cod. Tro. xxvii, where, as in all figures of B from Cod. Tro-Cort., the line of the jaw extends across the base of this oral object (see Brasseur, '80). By the omission of this line in the copy the object is thus made to resemble a "tooth" more than it does in the original. The true teeth of B in Cod. Tro-Cort are "tooth" and prominent, and the backward curving body at the side of the mouth may or may not be a "tooth." Until, however, it can be shown that this lateral body is a "tooth," the reference of B to Cogulludo's god with teeth "muy desformis" is doubtful, so far as this object is concerned.

‡ From the fact that it was customary in Central America, as in many other places, for divinities to be personified in ceremonials by men wearing grotesque masks with the symbolism of those divinities, it is possible to speak without valid objections of the heads of these divinities depicted in the codices as ceremonial masks or representations of the same. The terms "masks" and "ceremonial helmets" are significant words to use in this connection, against which nothing of value has yet been urged. The use of masks in certain Mayan dances still survives, and according to Valentini ('95) the tapir mask is still employed in a "ballet" of the "Zayi" dance. This latter fact, as mentioned by this author in connection with a cephaloglyph of B, is interesting, as the nose of B has been compared to the snout of the tapir by several authors.

The following features are common to all the figures of D in the Cod. Cort. :

1. Nose prominent, not hanging below the lower lip, pointed, not continuous with an upper lip, but separated from it by a notch ;* end of nose not curving upward.
2. Eye bounded by a scroll with marginal blocks.
3. Upper jaw toothless ; single tooth in lower jaw.
4. No curved oral object at the corner of the mouth.
5. No scroll over the nose.
6. Headdress present but variable.

The following table gives suggestive associations of D :

Associated with the symbol <i>kan</i> (maize).....	11
<i>kan</i> in the hand.....	4
<i>kan inix</i> in the hand.....	3
<i>kan</i> on ground before him.....	2
seated on <i>kan</i>	1
Associated with <i>ū</i>	1
Associated with <i>kin</i> †.....	2
Associated with <i>akbal</i>	‡
Associated with <i>ahau</i>	§
Associated with snake.....	3
Associated with falling water.....	1

In an analysis of this table we are struck by the large number of figures of D associated with the sign *kan*, maize.|| D is, we should judge from associations, a beneficent, not a malevolent, god connected with life, and the association of the snake with D and the existence of the *kin* sign on the head and at the feet suggest the sun. A figure of D is found once at least in the

* This notch is absent in all figures of B in Cod. Cort. Attention is called to the fact that the sign *akbal* is wanting on the head of D in Cod. Cort. In figures of D in Cod. Dres. it is sometimes present, as shown by Schellhas.

† In one instance on the head, in another on the ground before him. In some of the cephaloglyphs of D is a half circle which resembles a conventional sign of the sun.

‡ The existence of *akbal* on the forehead of the cephaloglyph of D will be discussed later. This sign occurs in the hieroglyphs of D in Cod. Cort., but not on the figures themselves.

§ Although associated with D in other codices, I find it with this god in Cod. Cort. only in one or two doubtful cases.

|| Many English equivalents of *kan* have been pointed out, but there is a singularly uniform acceptance of the belief that one of these is corn or maize. Some of the derivative meanings are not difficult to explain, as, for instance, "wealth" (abundance), etc., on the ground that *kan*, yellow, or corn is a primary translation. The Tusayan Indians use in the same way the word *ka-e*, maize, which has a startling phonetic resemblance to *kan*.

neighborhood of the hieroglyph for west, and once near that of east. He is frequently seated in a house marked with a cross.

The hieroglyph * ascribed by Schellhas ('86, p. 57) to G occurs, in Cod. Cort., over D on page xxix a 1. The cephaloglyph of D occurs over D in xvi a 1, † xxi c 1 (xxi d 3 without *akbal*, but with dots), xxx b 1 (?), xxvi c 2, xxviii b 1. It is found over another god in xxxiii b 2 and xxix, xx c 1. Modifications of the cephaloglyph of D with *akbal* surrounded by dots occur over animals or gods not identified as D in xxx a 1, xxix c 1.

Identifications of D.

It is natural that a pictorial element which forms such a constant and extensive element in the illustrations of the codices should be thought to represent an important deity, and it is not strange that D is identified with one of the most important of the deities mentioned by Spanish writers. Three identifications have more or less in their favor, viz., Itzamná, Moon god, and Kukulcan, and it is believed the evidence is good that it belongs to one or another of these three.

One of the first steps taken to identify D was by Schellhas ('86), who in his earliest publication pointed out some of the main features of symbolism, but assigned no definite name beyond the letter "D" and "God with the face of an old man." Later, however, he became convinced that it is a "Moon god." From Schellhas' first description ('86, p. 57) I quote as follows: "Geschicht eines alten Mannes mit eingefallenen, Zehnlosem Munde, verziertem Auge wie die Gott mit der Schlangenzunge" "vor den Gesicht herabhängenden Koppsmück der das Tageszeichen *akbal* ‡ enthält."

* The form of this hieroglyph given by Schellhas ('92, p. 104, first figure of D) does not occur with D in Cod. Cort., so far as I can find.

† Unfortunately the pages of the Rada y Delgado facsimile of the Cod. Cort. are not numbered, so that for uniformity with the enumeration of the pages of Cod. Dres. I have used Roman numerals, adopting the pagination of Rosny's copy. While, however, there was no other course to follow in referring to the Cod. Cort., I believe, as it and Cod. Tro. are undoubtedly fragments of one large codex, that a simpler paging of the Cod. Tro-Cort., taken together, is called for and must be devised to insure convenience of references as research progresses.

‡ This feature must have been overlooked by Brinton when he identified a figure of D with the *akbal* on the head as Kin ich ('95, fig. 74). The proper identification of the middle figure of fig. 74 (op. cit.) is not Kin ich, but the god D, if we limit Kin ich as Schellhas and Brinton have in their articles.



PLATE I.—The God "D," after Codex Cortesianus



In later publications ('87, p. 19; '92, pp. 110-111) the same author said of D that it "ist unzweifelhaft den Mondgott," which is the first of the identifications that I shall discuss. In following his argument stress is laid on the presence of *akbal* surrounded by dots, especially in the hieroglyph which is ascribed to D. In the figures of D in Cod. Cort. I have never found the sign *akbal* hanging down before the face as in figures of D in Codex Dresdensis.*

Granting, as we may with reasonable faith, that the hieroglyph of D is rightly assigned, it is well to attempt an interpretation of the component *akbal*† as a significant factor in the identification of D. The word *akbal* signifies darkness or night, and, according to Seler ('89, p. 58), the Mayas still use *akab*, *akabil*, and *akbil* to designate night. Others, as Kiche-Cakchiquel, use *a'kab*, *a'ku*, *a'kbal* for the same, and the Ixil *akbal*, according to the same authority. The Nahuatl equivalent, *calli*, means "house," which I may anticipate by saying it may refer simply to the sun-house or place where the sun sets, which, as the Nahuas associate with the west, refers to the western house, or place of sunset.

The Tzendal equivalent is Votan, which, according to Seler ('89, p. 57), is not the proper name of the sign, but that of a Cultus hero, the celebrated Votan, to whom the sign is consecrated. If we follow him in his derivation of *uotan* and find the etymologic meaning to be "Heart of expansion" or "Heart of the surface," it is possible that the root *tan*, "expansion," may refer to the sky, and the heart to the sun, possibly the same as the Kiche *uc'uxcah*, the heart of the sky, of the Popol Vuh.

The presence of *akbal* on the cephaloglyph ‡ of the Bat god (Seler, '94) and in the name of the Bat month (Landa, '81) adds little one way or the other to the interpretation of D as a Moon god, but conveys the same idea of darkness as in the cephaloglyph of D. The association of the Bat god with the under

* In figures of D the lower jaw is furnished with one tooth and is not toothless in Cod. Tro-Cort.

† This is not limited to the cephaloglyph of D.

‡ The term cephaloglyph is applied to those hieroglyphs which are simply conventionalized pictures of heads, either of gods or animals, and are readily distinguished from day signs (hemeroglyphs), numerical signs (metrogllyphs), and others. The hieroglyphs of the different gods often contain as an important component the cephaloglyph of that god, as B, C, etc.

world as a subterranean cavern is in harmony with the idea of the solar interpretation of D, for the sun in setting sinks into the under world in the conceptions of many American tribes.

Manifestly, if the etymologic analysis given above is correct, or approximately so, we find naught in *akbal*, except the meaning "to become dark," to suggest the moon, and this can be explained on the supposition that *akbal* refers to the sun of the under world or the sun sinking into his western house, *calli*, followed, as suggested by Seler, by the Cihuateteō, daughters of the Earth goddess, into whose home the sun goes.

An examination of other arguments presented by Schellhas that D is a Moon god has not carried conviction. The association with the snail in the light of the relationship of this animal to the winter solstice recalls not a Moon god, but rather a Sun god. This author says ('87, p. 19): "Dass die in sorgfältig ausgeführten Varianten der Hieroglyphe des Gottes (wie die oben abgebildete) unterhalb des Mondgesichtes befindliche bogenförmige Figur den Mond in seinem Viertel darstellen soll. Es spricht dafür noch die interessante Thatsache, dass in Landa's Alphabet eine ganz ähnliche mondviertel förmige Figur gegeben ist, mit dem phonetischen Werthe U. U heist der Mond in Maya." In an examination of this argument we must bear in mind that Landa gives two signs for *U*, one of which, to be sure, might be called a crescent (a moon symbol), but the other is a simple spiral, recalling the coil in *caban*. Surely the crescent sign for the letter *u* is not always a prominent element of the hieroglyph assigned to D.

Schellhas ('92, p. 110) points out that there is "einer unbekannten Beziehung" between D and a "Water goddess, I," who has a serpent headdress. I think we may accept the belief that a goddess with a serpent headdress is a serpent being or in some way related to such a one. The association of D and I is not obscure if D be regarded a Sun god, as sun and serpent symbolism are almost inseparable in American mythologies. On the theory that D is a Moon god, it is difficult to explain the anomalous association with a goddess bearing the serpent.*

*One figure of D in Cort. Cod. carries in the hand a serpent object (aspergil? or rattle?), and there are in the other codices other instances of serpent symbols associated with D.

Dieseldorff has added an important bit of evidence to the theory that D is a Moon god in his remarks on the decoration of a jar from Coban.

After pointing out the presence of the snail (which, I believe, does not militate against, but rather supports, the claim that D is a solar god), he says ('93, p. 380): "Das Zeichen Akbal, welches Nacht bedeutet, wird bei dem Stirnschmuck durch die Mondsichel ersetzt, von welcher Büschel niederfallen, in denen ich vermuthe, dass Regen dargestellt sein soll (vergl. Dresd. 74); auch sitzt der Gott an einem Wasserlauf." The figure referred to as attached to the forehead is certainly crescentic in form, and therefore not unlike a moon, and there is a likeness between the water falling from the dragon's head of the celestial tablet in Dres. 74, and, we might add, from the rain-clouds below it, and the "büschel" which fall from the crescentic figure of the forehead of the decoration of the Coban jar. Notwithstanding, however, these coincidences, all can be explained on the theory that D is a solar god, except the crescentic body. Supposing that the crescent in this figure has the same position as *akbal* in figures of D in Cod. Dres., we may compare the "büschel" with the appendages to *akbal* in those figures of D in Cod. Dres. which had this sign above the head. In such figures, of which there are several, there is little resemblance between the appendage and water; so that there may be a doubt whether the "Büscheln" of the Coban jar really represent water, as supposed by Dieseldorff.

If, moreover, the symbol *akbal*, night or darkness (to become dark), refers to the moon, there still remains to be interpreted that example of D which has the *kin* (sun) sign on the forehead and those like Cod. Dres. xv c, which carry *kin* (sun) in the hand, which are readily explained on the theory which follows, that D is a solar deity.

The reasons, which appear to me to be valid, for the identification of D as Itzamná have been exhaustively stated by Seler; but while I have no new evidence, it seems to me that a few additional facts available add some weight to the conclusion that it is a Sun god of the hieroglyph *akbal* surrounded by dots. He says ('89, p. 64): "La figure 366 [*akbal*], le symbole du dieu Itzamná, me paraît indiquer la lumière qui descend de l'obscurité de la nuit, le ciel étoilé." On the supposition that D is a solar deity, I should regard it as well symbolized by *akbal*, the

dark sun (under world sun) surrounded by the dots representing sunrise or sunset rays.*

Seler's studies of the Maya calendar have yielded important results in regard to the meaning of *ahau*, which are highly instructive, considering the association of the god D with the sign for east. *Ahau* signifies "king," "master," according to this authority, and "in this acceptance is employed not only in the Maya of Yucatan, but also in the different languages of Guatemala." He derives it from the masculine prefix *ah* (prefix denoting possession). "La signification fondamentale de *ahau* est, en tous cas, homme, maître; les deux racines *ah* et *ru*, qui ont la même signification, paraissent concourir à la formation de ce mot (Seler, '89, p. 110)."

The meanings of *ahau* given by Brasseur ('70, p. 132) are "Sieigneur, prince, roi, souverain." According to Seler, this author translated it "maître du collier," master of the collar.†

One "master," "king," or "sovereign" sometimes referred to by *ahau* is undoubtedly the sun, and the interpretation of the Kiche myth of Hunahpu and Xbalanque by Seler is highly instructive in this connection. Comparative studies also indicate the same, and Seler finds that Hunahpu "répond au mexicain *ce rochill* qu'on rencontre dans le Cod. de Vienne 23, comme symbole certain du dieu du soleil, ou, plutôt, comme le nom même du dieu du soleil. Le soleil étant le roi des dieux, *ahau* et *hunah pu* s'accordent parfaitement avec le mexicain *rochill*." In view of the application of the hieroglyph *ahau* to the sun, the reader's attention is called to the conventional Tusayan sun symbol as figured in my account of the Palülükonti. The upper segment of the disk of *Tawa* (Sun) is separated from the lower by a horizontal line, from the middle of which arises a vertical which divides the segment into two parts, comparable with some variants of *ahau*. (Seler, '89, p. 111, figs. 848-851, 871-873.)

* No one in discussing the theory that D is a Moon god seems to have called attention to the paucity of references to a Moon god in Spanish or semi-Spanish accounts of Maya or Kiche mythology. In D we have a god pictured almost as many times as the most numerous A or B. If it is a Moon god, is it not strange that it is so seldom referred to in Spanish writings? Brinton ('95, pp. 37-45), in his account of the Maya mythology, does not mention a Moon god, justly, I believe, on account of its insignificance in the Maya Olympus, and we look in Popol Vuh (Brasseur, '61, pp. 5, 7, etc.) in vain for a Moon god among the powerful deities. Does not this fact convey a word of caution to the observer against assigning to the Moon god the figures of D, which are among the most numerous in the codices?

† A god with an *ahau* on the head and collar on the neck is referred to later.



PLATE II.—The God "D," after Codex Cortesianus

As shown by several authors, as, for instance, Thomas ('93, p. 248), the upper part of the sign for east is probably *ahau*. If the word for east (*likin*) is expressed by *ahau kin* (master sun), the figure of D below it is not explained by the hypothesis that D is the setting sun, provided, of course, this symbol is rightly assigned to the east, as I believe it is. But evidence drawn from the argument that D is in the west world-quarter in the Tableau is offset by that drawn from the existence of D in the opposite, or east, world-quarter in the same Tableau. Evidently little light on the question of whether D is a setting sun can be derived from the position of D in the Tableau, so far as the element *ahau* in the east world-quarter sign is concerned. Furthermore, if the bound figure in the south world-quarter is the same as the right-hand upper figure of Cod. Cort. xix b, who has an *ahau* on the head, new complications arise; for if it is to be interpreted the moon on the forehead of the sign of D, why not likewise call it a moon sign on this figure? This question, of course, might also be asked: If *ahau* is regarded as a sun sign, why is not the yellow figure with the high collar and *ahau* sign a sun god? *Ahau* is a common prefix or suffix for many and diverse gods and exists in their names, "Cum Ahau," "Lord of the Vase" (probably Itzamná—Brinton, '95, p. 42), Hunahpu, Ahraxahak, Ahraxa Trel (Brasseur, '61), etc., and does not in all instances refer to a sun god.

Ahau is said (Seler, '89, p. 113) to form an important component in hieroglyphs referring to gods of light,* life, and prosperity, but is completely absent in those of hostile powers, the divinities of death. It is natural to refer such to solar rather than to lunar deities (which are more often sinister and dark in nature), gods of the under world, death, and hostile powers.

Seler ('89, p. 57) states his views that D represents Itzamná so clearly in his interpretation of some of the sitting figures in the Tableau des Bacabs that I will quote him at length: "Sur la fameuse feuille 41-42 du Codex Cortez que Cyrus Thomas a discutée dans sa récente publication, nous voyons au milieu des quatre points cardinaux, deux divinités assises sous un arbre (le yax ché le ceiba?); nous avons certainement reconnu l'ancien dieu, Itzamná, le dieu père, d'après Hernandez, et sa com-

* By comparative studies of the other codices I find that there is good ground for the belief that the sign *ahau* is associated with D in several instances.

pagne (Ixchel, la mère de Chibiriac, la mère de Bacab). Les mêmes divinités se trouvent en haut de l'image, parmi les signes du ciel qui, d'après l'hypothèse habituelle, désignent l'orient, mais peut-être la direction du sud. Au milieu de la figure, le dieu tient une pile de trois signes *ik* (fig. 253) ; devant la divinité se trouve une autre pile (fig. 254) qui montre, en dessous, le symbole du vase, en dessus le signe *ik*, et enfin une figure d'animal peinte en rouge* qui fait penser au signe *imix*, le symbole de la fécondité."

A third identification of D is by Brinton ('95, p. 56), who differs from all others in referring it to Kukulcan. He mentions the several characteristics of D, and regards them as "traits coinciding" with the myths of Kukulcan. I regret that he has not discussed the different interpretation of the same characteristics by Seler and Schellhas, and, as I find no distinctive feature among those mentioned to prove that D is Kukulcan, his argumentation does not appear to me conclusive, or is at most incomplete.†

Schellhas has shown ('86, p. 58) that the god D has an appendage to the chin comparable with a beard, and claims that it is absent in all other figures: "Er (beard) kommt bei keiner anderere Figur der Handschriften vor." Notwithstanding this feature is not universal in figures of D, indeed occurs in but one figure of D in Cod. Cort., Brinton ('95, pp. 56, 57) gives it weight in an attempt to identify D as Kukulcan, and says: "When we perceive that he, and he alone of all the deities, is occasionally depicted *with a beard under his chin*, just as Cuculcan wore in the legend, the identification becomes complete."

We find a figure of the head of D emerging from a "green dragon" in one page of Cod. Dres., and this fact has been adduced in evidence that D is Kukulcan. It is said in Popol Vuh (p. 315) of Gucumatz, the Kiche equivalent of Kukulcan, that every seven days he took on the nature of a snake and was veri-

* In my copy of the Rada y Delgado facsimile of the Codex Cortez the part of the pile of three signs mentioned as a figure of an animal is not *peints en rouge* and is of the same color as the other two.

† This author says that D generally bears the sign *akbal* "because he is the setting or night sun; for which reason his headdress is often the horns of the eared owl." I readily subscribe to the view that D is a Sun god, possibly in cases where he has *akbal*, the darkened sun, but know not the evidence that the horn sometimes represented on the heads of this and other deities is the horn of the "eared owl," and reserve an expression of opinion on that point.

tably a snake, and it is natural to use a figure with a serpent body in support of the theory that it represents Kukulcan. The force of the argument is, however, that D is Kukulcan is somewhat diminished when we remember that in two instances in Cod. Cort. a figure of a snake bears the head, not of D but of B, and the reptile figured with D in Cod. Dres. differs from a snake in having legs.

While Brinton finds that Itzamná is generally connected with Yaxche, "The Tree of Life," which he, as Seler, believes to be represented in the middle of the Tableau des Bacabs, he identifies the god under it in this instance as Kukulcan, and does not refer to Seler's strong argument from this very association that it is Itzamná. So far as I can follow the evidences brought forward to identify D as Kukulcan, they do not seem to me to overthrow those of Seler that D is Itzamná.

The exact relationship between the text and the accompanying pictorial elements or components of the codices are more or less indefinitely known, and it is commonly supposed that there is a connection between the two. In some instances, however, I think I can show that this connection is distant. Let me illustrate by a figure (Cod. Cort. xxxix b 2) which I have identified as D. Saville ('94) has shown that pls. xxxi-xxxviii plus the lower half of xxxix (Cod. Cort.) is a tonalamatl. This tonalamatl consists of eight full pages divided in the middle of a horizontal red band. In the upper half there are sixteen figures, and in the lower the same number, making thirty-two figures in all in these eight pages. Over each of the thirty-two figures there are six hieroglyphs, of which that in the lower right-hand corner is the *same* in *all* the thirty-two clusters. Whatever this series of thirty-two groups of six glyphs means, each group closes with the same sign, verb, substantive, or what not.

Taking now a fresh start and looking at the lower series of sixteen groups, of six hieroglyphs each, we find that the seventh and eighth groups (xxxiv b, Cod. Cort.), counting xxxi b as the first, have all the six hieroglyphs (cephaloglyphs and other components) identical with the sixteenth. In other words, a lesser series of eight closes with the same six glyphs, followed by a different series of eight, likewise closing with the same six signs. In this repetition we may have a coincidence, but it is interesting that it is connected with the number eight. From a point of view of comparative ceremoniology, this continual and rhythmic

repetition suggests songs, incantations, invocations, or prayers rather than histories or accounts of rituals.*

Again, the figure of D drawn below the eighth group of the lower series (xxxiv b 2) of the tonalamatl has, as shown above, the same six glyphs above it as a Black god (op. cit. 1) and a figure of the turtle in the sixteenth group (xxxvii b 2). Evidently, therefore, the text embraced in the six glyphs of each of these three is not illustrated by the same pictorial component. None of the three sets of six identical hieroglyphs contains the cephaloglyph ordinarily ascribed to D or that of the Turtle, although the glyph for earth is present in all and the cephaloglyph of B and one other is universal. Recognizing an absence of knowledge of what the whole series means, we are not denied the statement that there is a want of harmony between the text of the lower parts of plates xxxiv and the second part of plate xxxviii and the accompanying pictorial elements. I venture the suggestion that the series of thirty-two groups of glyphs referred to as a recitative invocation or prognostic and the predominance of the cephaloglyphs of solar deities implies that it pertains to these deities. The character of the pictorial elements does not prevent an acceptance of this theory or one of a related nature.

Similarity in Symbolism to God G.

Both B and D have masks which are similar to that of G,† which is generally recognized from the presence of the sign *kin* on head, arms, and thighs, and in the hieroglyph as a Sun god.

As Schellhas has pointed out, there is no figure in Cod. Cort. which corresponds with god G as described by him. It would therefore naturally not be considered in this article, but from the fact that symbolically it can only with difficulty be separated from B or D, the one feature, the sign *kin* mentioned as distin-

* It is a suggestive fact in this connection that the glyph *paz*, which Brasseur translated as a musical instrument and Brinton identifies as a drum, occurs many times in the series, in most instances just before the final glyph common to all, never, so far as can be seen, as an initial sign in the series.

† It is evident that there is such a close likeness between G (Kin ich ahau) and Itzamná that it amounts to an identity, and Landa speaks at least twice (pp. 89, 97) of a ceremonial idol which was called Cinchahan Yzamná or Chinchán Yzamná. Here is a reason for a belief that Kin ich ahau is so closely allied to Itzamná that Spanish accounts confuse them. The symbolism of B, D, and G as expressed in the codices is so close that I doubt whether we are justified in separating G from the other two, and the evidence that G is a midday sun, while B and D are sunrise and sunset attributable names, is not wholly satisfactory.

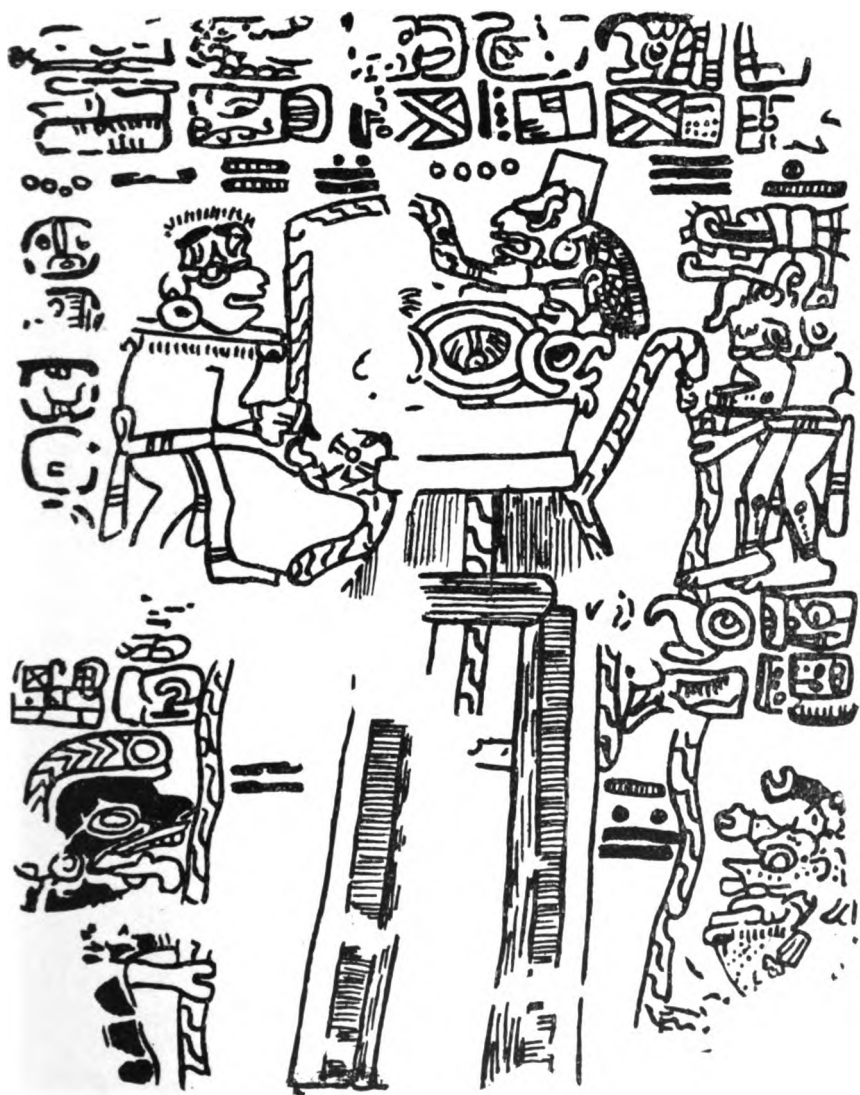


PLATE III.--Summer Solstice, after Codex Cortesianus



guishing it, being insufficient. As this is said to be one of the easiest gods to identify, and as the above statement is a departure from the interpretation of Schellhas, an examination of figures of G in other codices is called for in evidence of the validity of my conclusion ('92, p. 113.)

Schellhas' diagnosis of G is as follows: "Charakterisch für seine Darstellungen ist ausser dem sonnenzeichen *kin*, das er auf Körper trägt, eine eigenthümliche Nasenverzierung (fig. 43) die wie man aus einem Vergleich mit anderen ähnlichen Darstellungen im Dr. Sieht nichts anderes ist, als ein grosser und besonders kuntvolles Nasenflock." It would seem that the one essential characteristic of G is the sun (*kin*) symbol on the body, arms, or head, or in a hieroglyph which is associated with G.

According to Schellhas ('86, p. 62), there is one characteristic of G which never fails, viz., "die gebogene Verzierung auf der Nase," an appendage easily recognized from a figure of it which he has given in another article ('92). As this appendage or any well identified figure of G is not found in Cod. Tro-Cort., let us turn to Cod. Dres. for figures with this appendage. We find it well marked in XI b 1, XI c 2, XV a 1, XXII b 3, all of which have the sign *kin* on back, thighs, arms, or head, and all have the curved "tongue" in the angle of the mouth like B. The homology of the curved nasal appendage is shown in XIII a 1, where we find it comparable with the body above the nose in B. In looking over the 130 figures of B in Cod. Dres. I find twenty-five, more or less, decorated with what might be called *kin* signs on body, thighs, arms, or head, not half of which have the nasal body in the form said to be characteristic of G, while many do not have the hieroglyph referred to the same god.

A result of my examination of G in Cod. Dres. has therefore convinced me that, instead of being the "easiest of all to identify," it is one of the most difficult, and I have been led to doubt whether the so-called differences in symbolism between G and B are important enough to always separate them. The theory that G represents the "Mid-day Sun," while possible, has certainly not been shown to be so beyond doubt by the evidence presented.*

* According to Schellhas ('92, p. 113), in no other codex except Cod. Dres. is there found a figure of a god (except G) which has the sun sign (*kin*) on the body, but in Cod. Cort. there is a figure of D with *kin* on the head, as I have shown in this article.

The diversity of opinion in regard to the proper identifications of B and D as Kukulcan and Itzamná or vice versa, whichever may be right, still allow us to consider both solar deities, as indicated by the contents of the codices.

Some of the evidences which may be mentioned indicating the solar nature of B, D, and G are—

1. Association with the signs *kin* and *ahau* (except B).
2. Association with all cardinal points (D generally with west).
3. Association with snake (plumed) and falling water.
4. Association with or engaged in beneficent acts, planting, pouring water or *kan* (maize field, corn, etc.).
5. Torches in one or both hands.*

The lower half of plate XIX (Cod. Cort.) is instructive to study as a whole in connection with the theory that B and D are solar deities, as they and the other deities in the series forming the tonalamatl † (pl. x, xxxi-xxxix) figure in it. An explanation of this picture as a whole may be as follows:

In the middle we find a house represented, perhaps a sun-house (earth, under world). Meandering on each side of this house and entering it, or passing behind it, is a cord (serpent?), the symbol of the path of the sun. The Maya artist placed on this path the symbol *kin* (sun) as if to show what he meant, and to it joined by a kind of umbilical attachment four gods (B, A, the Black god, and a god with an enormous collar and *ahau* on the head), thus indicating how intimately these gods were connected with the sun. At the point where the pathway (cord) enters or leaves the house is the Turtle, ‡ emblem of the sum-

* I do not regard it necessary to draw from comparative mythology facts in support of the worship of several suns (see Spencer's Synthetic Philosophy, I, p. 377), nor do I feel called upon to account for the "cultus hero" element of Kukulcan except to say that it would be perfectly natural for primitive man, as has happened again and again independently, to ascribe the beneficent attributes of one luminary or even his name to a religious reformer, teacher, or great leader.

† Although the enumeration of the four rows of day signs on pp. xxxi-xxxix is not the tonalamatl (260 days), possibly such was intended by the writer.

‡ In a later publication on the Death god, A, the following resemblances between it and the Turtle as a symbol of the solstices will be discussed:

1. The globular bodies ("eyes," "bells," etc.) on the heads.
2. The zigzag lines ("spear-point") crossing each other on the head of A and the carapace of the turtle.
3. The bands on the body.
4. Short, stumpy tail of some pictures of A.
5. Shape of eyes of A and those of the Turtle.

mer solstice (Förstemann, 392 *a*), with the *yax* sign to denote the sun's force at that point. The god D, like the other four, grasps the cord (the umbilical attachment not visible).

The two lower gods are A, Death god, and the Black god (Ekchuah?), both gods of the under world. Two of the three of the upper half we know as B, Kukulcan; D, Itzamná. But what of the third? Glancing at the Tableau des Bacabs, we see in the world-quarter with the symbol for south a similar personage bound and seated, but with no sign of *ahau* on the head, although a halo is not wanting. Here also, if we consider the Death god as north, this god is south, diagonally opposite the north. Considering that the four gods united to the cord are four world-quarter gods, beginning at A and following a sinistral circuit, we would have A, Death god (north); B, Kukulcan (east); "Bearer of the collar" (south), and Black god (west); or, if we regard B as god of a fifth direction and include D in the circuit, we would have N., W., S., E., and B (middle, above). This lower half of plate XIX (Cort. Cod.) closes a tonalamatl, of which it is the eighth (significant) page, the preceding bearing the four rows of day-signs which constitute that epoch. Every page of the section of eight, of which it is the last except itself, has falling rain depicted on it. There are six snakes on the seven preceding pages, so arranged that every page has the head or part of the body of one of these reptiles. We are, so far as can be judged from pictorial components of these pages, dealing with a rain occurrence of some kind, in which Kukulcan, the plumed serpent, and falling water figure conspicuously. Let us suppose that the lower part of page xix represents the summer solstice or the Turtle month, *Kaiab*, whose cephaloglyph has a turtle's head in composition (see Landa). If the preceding seven pages refer to a ceremony, to what one, using Landa's calendar, shall we look? According to Landa, in the month of *Pax* was celebrated the Pacumchac, in which the rites of Kukulcan performed in November were repeated. In this month (May) the rains in Yucatan begin. The plumed snakes spread over pages xii-xviii, the figures of B Kukulcan, the falling water on every one of the seven pages, the culmination of the eighth page in a picture with a turtle and the sun's course, as I have theoretically interpreted page xix, may not refer to ceremonials described by Landa at the summer solstice and the month be-

for it, but there are many circumstantial coincidences between them, connected, doubtless, with cycles of time and movements of heavenly bodies.

If, however, the seven pages refer to astrologic or astronomic events, as the character of plate XIX would imply, we may have represented simply the position of certain celestial bodies, evidently prominently the sun, whose symbol is so constant.* But if the symbols in the Celestial Band are rightly assigned to planets by Förstemann, possibly this series deals with the planets Venus, the moon, and possibly others. The astronomical explanation rather than the ritualistic appeals to me when I study the symbols, but the association of ceremony and position of the sun, planets, stars, etc., was so close that the ritualistic element is not absent from these plates.

The so-called Tableau des Bacab, which relates to a ritual period of 260 days, as indicated by the day-signs and accompanying dots, has three figures of D, one of which is seated under a *yak-che* or tree of life in the center, one seated in the eastern, and one in the western world-quarter. The one in the eastern house† faces a female or Earth goddess, before whom is a symbol of *kan* (field of maize), upon which falls either the lightning (the fertilizer?) or the fierce rays of the sun.

In conclusion, I would state that some of the results of my studies of the three gods B, D, and G are—

1. They represent solar deities referable to those described by Spanish writers as Kukulcan, Itzamná, and Kin ich ahau, or the latter combined.

2. The symbolism is very similar and characteristic, differing considerably from that of other gods, and indicating close relationship in the supernatural person depicted.

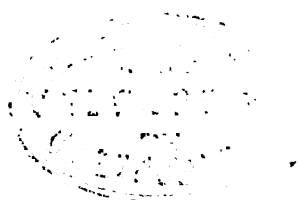
3. While evidence is good that B may be identified as Kukulcan and D as Itzamná, it falls short of proof of this or of the reverse theory. The argument that D is one of these personages is stronger than that it is a Moon god pure and simple.

* Brinton has already pointed out that the upper series of XIV, XV, XVI "may represent positions of certain celestial bodies before the summer solstice (indicated by the turtle, p. 7)," but I regard the summer solstice as pictured in p. XIXb for the lower series.

† The cross on the upright of these houses, which occurs so frequently in the codex, may refer to the sun or the sun-house (see Seler, '89, p. 58, where the cross is spoken of in the figs. 256-258). It is an interesting fact that a similar cross, as I have elsewhere shown, among the Tusayan Indians is a symbol of *Cotokmüwa*, the Heart of All the Sky. In the discussion of *akbal* by Seler it seems that a cross has relation to the heart of expansion in Mayan mythology.



PLATE IV.—After Codex Cortesianus



4. The lower part of page xix (Cod. Cort.) is an example of picture-writing representing the summer solstice and the course of the sun with world quarter gods.

Spanish accounts of the peculiarities of Kukulcan and Itzamná are so vague and the differences indicated so doubtful that little information is added to our knowledge by affixing one of these names to B in preference to D, or vice versa ; but the recognition of B, D, and G as solar deities, if supported by the good authority of facts, is a step forward in the interpretation of the pictorial elements of the codices.

I have introduced on the fourth plate seven pictures of an Earth goddess associated with the god D in several cases. The proper identification of this personage is as yet doubtful, but I incline to Seler's view that they represent Ixchel. In those instances which are intimately associated with D, as in *Tableau des Bacab*, it would seem that here we have one form of the Earth mother, as, in a way, the Sun god D is the father ; but this view may be subject to modification on more extended studies.

This goddess is identified by Brinton as the "Evening Star in her epiphany as Mother Earth, source of life, ancestress of the race." He calls her ('95, p. 63) by her Kiche name, Xmucane, drawing *evidence from analogy of the Kiche mythology* of Popol Vuh and that of the writers of the codices. The two figures in the middle of the *Tableau des Bacabs* he identifies as "Cuculkan" and Xmucane, and considers the latter (op. cit., p. 64) the "female counterpart of Cuculkan" or "consort" of the same. These two he calls (p. 49) "our first parents"—evidently male and female. He states that Gukumatz, however, "is positively said to be the bisexual principle of life represented by the male Xpiyacoc, and the female Xmucane, ancestor and ancestress of all that is." I find it difficult to harmonize these two statements if Gukumatz and Kukulcan are the same or like conceptions, as I think they are.

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THE EARLY NAVAJO AND APACHE

BY FREDERICK WEBB HODGE

The oldest clan of the Navajo, according to the great creation and migration tradition of that tribe, an outline of which has been published by Dr Washington Matthews,* is the Tse'jinkíni, the House-of-the-dark-cliffs people. These are the descendants of the first two human pairs, who had their origin in the San Juan mountains, the first pair having been created by the gods from two ears of corn brought from the cliff houses in Tse'gihi, a cañon somewhere in the country north of the Rio San Juan, perhaps the Mancos or the McElmo. The Navajo estimate, as interpreted by Dr Matthews, fixes the time of the creation of this couple between 500 and 700 years ago, or seven ages of old men. Historical comparison, however, seems to establish the genesis at a more recent date. *use figure*

According to the tradition, seventeen years elapsed ere the Tse'jinkíni were joined by the Tse'tlani or Turn-in-a-cañon people. In fourteen years these two peoples were joined by the Dsilnaoçilni or Dsilnaoçilcine† (Dsilnaoçil-mountain people). Seven years later, or 38 years after the creation, the Qackà-qatsò-çine or Yucca people united with the others, thus forming a fourth clan. Fourteen years after the accession of the Yucca clan (52 years after the creation) these combined people moved to Chaco cañon, near the ruin of Kintyèli, where they were joined by the Naqopà-çine, from the salt lake south of Zuñi. The tribe now moved to the San Juan. Six years afterward (58 years after the creation) a sixth band came—the Tsinajíni or Black-horizontal-forest people. As yet they had no herds, and they made their clothes mostly of cedar bark and other

* *Jour. Am. Folk Lore*, vol. iii, no. ix, p. 90 et seq., 1890. Dr Matthews has now in preparation for publication the complete legend as it was related to him by the Navajo shamans. The importance of such a production may readily be conceived by any one familiar with this scholar's admirable record of the Navajo "Mountain Chant," in the Annual Report of the Bureau of Ethnology for 1883-'84, which, so far as I can recall, was the first complete record of an Indian ceremonial ever published.

† The character ç used throughout this paper approaches in sound the English *ts* and is equivalent to the ç of Dr Matthews.

vegetal fibers. Eight years after the appearance of the Tsina-jini came the Çqa'nesá'ni, so named from the place where they were first found in camp by the Navajo. This was 66 years after the creation of their first people, or, perhaps we had better say, after the appearance of the primal couple or couples.

After a period of five years succeeding the adoption of the Çqa'nesá'ni, the Dsiltlá'ni people were incorporated, and five years later (76 years after the creation) an important accession to the population of the tribe was gained from a place called Çqa'paha-qalkái, near the present town of Santa Fé. These people were therefore named Çqa'paha'-éine, and their chief was Gò'tso or Big Knee.

Years after the Çqa'paha'-éine joined the Navajo a band of Utes were adopted, and about the same time a party of these Utes made a raid on the Mexican settlements somewhere in the neighborhood of Socorro, on the Rio Grande, and captured a Spanish woman, whose descendants form the People-of-the-white-stranger or Mexican clan of the tribe. At this period Big Knee, the chief of the Çqa'paha, was still alive, but he was very old and feeble. As the age of an old man is definitely fixed by the Navajo at 102 years, the number of counters used in their game of *kesitcè*, and as the genesis tradition calls particular attention to the age and feebleness of Big Knee, it will be reasonable to assume that he was, say, 120 years of age at the time the Ute clan (Noçàéine) raided the Mexican settlement near Socorro.

Prior to 1598, the date of Juan de Oñate's journey from Mexico for the purpose of colonizing the new country, no Spaniards dwelt in New Mexico excepting the missionary left by Coronado at Pecos, who was never afterward heard of, and the two *fratres* killed at Tiguex before 1582. In 1617 there were only 48 soldiers and settlers in the province.* In 1630 Fray Alonzo Benavides reported that 250 Spaniards dwelt at Santa Fé;† but this town had been founded as the capital only about 20 years previously and was the sole settlement of Spanish origin in the entire province. Aside from Santa Fé, and exclusive also of the few missionaries scattered among the Indian pueblos, it is quite improbable that there were any other Spaniards in New Mexico in 1630. In 1680, the year of the great Pueblo revolt, a few over

* Baneroft, *Arizona and New Mexico*, p. 159, after early document.

† *Ibid.*, p. 162, after Benavides.

400 Spaniards (including 21 missionaries) were killed, and some 1,950 escaped southward with Governor Otermin to El Paso. Twenty-three hundred and fifty souls, therefore, represented approximately the number of Spanish inhabitants early in 1680—a growth of but 2,100 in half a century—a population scattered along the Rio Grande for over 200 miles.

It is highly improbable that Spanish settlements existed along the lower Rio Grande earlier than the middle of the seventeenth century; certainly none were there in 1630. El Paso was settled by the Spaniards in 1659, and Albuquerque was reputed to have been founded as early as 1658, but regarding the latter authorities fail to agree. At any rate, Mexican settlements existed along the Rio Grande in 1680, when Otermin retreated from Santa Fé to El Paso, for along the way he observed several haciendas that had been destroyed by the Indians, "with evidence that the occupants had been killed." Spaniards also apparently lived in Indian pueblos at the time named, for at San Juan three Spanish women were kept alive and bore children during their captivity. According to Escalante there were one Spanish villa (Santa Fé) and several small Spanish settlements in New Mexico before 1680.*

Assuming, then, that the raid of the Spanish settlement near Socorro by the Noçà'ine clan of the Navajo occurred about 1650 (while Big Knee was still alive), that the old chief was 120 years of age at that time, and that he had reached the age of at least 30 years when his people were incorporated by the Navajo, the date of the last-mentioned event must have been some 90 years previously, or approximately in 1560. It already has been seen that the accession of Big Knee's people as a clan of the Navajo took place 76 years after their creation; hence the date of the reputed divine origin of the primal couples, according to native traditional chronology, must have been about the year 1485.

It also has been shown that the Naqopà'ine from the salt lake south of Zuñi became a part of the Navajo 52 years after the creation, which from our calculation would fall in 1536. It will be remembered that Friar Marcos of Niza, on his way toward Cibola, in July, 1539, encountered among one of the Piman tribes of northern Sonora an old Cibolan (Zuñian) Indian, who informed him of the existence, in the north, of the

* See Bancroft, *Arizona and New Mexico*, pp. 168, 170, 181, 182, 190, 214.

1650
na

1560

1485
orig

provinces of Acus, Marata, and Totonteac. Acus has been identified with Acoma, Totonteac with Tusayan, and Marata with the group of pueblos called by the Zuñi Mak'yata or Mat'yata, near the salt lakes about sixty miles southeast of Zuñi pueblo. Marata was inhabited at the time the old Cíbolan fugitive left his tribe years before, and he was, naturally enough, under the belief in 1539 that it was still an occupied pueblo, although his people had been at war with those of Marata. It appears that Marata had been abandoned on account of Zuñi hostility not very long before the conquest of Cíbola by Coronado in 1540, the year following Niza's visit to the country, for while on their way to Acoma from Hawikuh by the southern route some of Coronado's followers observed the walls of a pueblo ruin still standing to a height of thirty-six feet.* This could not have been the case had the pueblo been abandoned more than a few years. From these circumstances it would therefore appear that the Naqopà'-éine clan of the Navajo, who "came from a place south of where is now Zuñi, near the salt lake called Naqopà'," were the former inhabitants of the villages or "province" called by the Zuñi Mak'yata and recorded by Niza as Marata, and that they were forced from their old home by the Zuñi, the main body, at least, joining the Navajo about 1536.†

There is other evidence toward fixing this year (1536), or perhaps better this decade (1530-'40), as the time of the abandonment of Marata and the adoption of its people, the Naqopà'-éine or Naqopàni, by the Navajo: About 1542 the Black-horizontal-forest people made their appearance, but the Navajo "had as yet no herds; they made their clothes mostly of cedar bark and other vegetal fibers and built some store houses among the cliffs." A statement so explicit at this point in the legend naturally leads to the conclusion that about this period occurred a most important chapter in the history of the tribe—the introduction of sheep and cattle. In the more detailed part of this legend given by Dr Matthews‡ it is related that the first sheep,

* Relacion de lo que Hernando de Alvarado y Fray Joan de Padilla descubrieron, etc., 1540, in *Doc. Ind. de Indias*, III, p. 511.

† I have been informed by Mr F. H. Cushing that some of the Mak'yata people were adopted by the Zuñi, and that certain words of their language are still preserved in some of their sacred rituals. Examination by Mr Gatschet of such terms as Mr Cushing found it possible to record seems to indicate Keresan affinity.

‡ Noqolpi, the Gambler: A Navajo Myth, in *Jour. Am. Folk Lore*, vol. II, no. 5, 1889, p. 89.

asses, horses, swine, goats, fowls, and manufactured cloth, as well as the first Mexicans, were created by Bekotciċe, the God Who Carries the Moon, for a legendary hero named Noqoilpi, who, after his visit to Bekotciċe in the sky soon after the Navajo appeared at Kintyċeli, which pueblo was then in process of building, descended far to the south of his former abode and reached the earth in old Mexico. "Naqoilpi's people [the Mexicans or Spaniards] increased greatly in Mexico," runs the legend, "and after a while they began to move toward the north and build towns along the Rio Grande."

That one part of the legend should so thoroughly support other portions in point of time is remarkable, and emphasizes the weakness of Zuñi tradition when compared with it.* The coming of the Naqopà'-ċine, the subsequent accession of the Black-horizontal-forest people, and the advent of the Mexicans under the guidance of Noqoilpi with their horses, sheep, cattle, and bayeta, of which they make their finest blankets, all tend to show that the Marata people were incorporated about the year 1536, and that the Spaniards came with their civilizing influence a few years later. The first flocks and herds were brought to New Mexico by Coronado's army late in 1540, and there seems to be every reason for believing that the then insignificant Navajo obtained their first supply of livestock through the Pueblos soon after the army left the country in 1542, as the legend indicates.†

1540-5

Some twenty-four years after the adoption of the Naqopà'-ċine from the salt lake, or about the year 1560, the first Apache came from the south in a large band and joined the Navajo, forming the Tsejinċiċi (Black-standing-rocks) people. Between the latter date and the occurrence of the Socorro episode of 1650, above referred to, the Ćestċini (Red-streak) and Tlastċini (Flat-red-ground) Apache peoples were incorporated. These three clans formed a phratry. The Navajo tribe now had nineteen clans, distributed about as follows:

One Athapascan (the original Navajo; evidently cliff-dwellers).

Three Apache, one being mentioned as a large band.

Two Yuman, evidently Mojave or Walapai, and Havasupai.

* See "The First Discovered City of Cibola," in *Am. Anthropol.*, April, 1895.

† The army left Compostela with 5,000 sheep and 150 cows of Spanish breed; these were the first that were brought into the country now forming the United States.

One Marata, evidently of Keresan stock.

One from north of the San Juan, possibly Shoshonean.

A single Ute family, who joined the Çqá'paha, besides one girl, whose descendants formed a new clan.

One from near Santa Fé (in two bands), with whom some Zuñi were afterward affiliated without forming a separate clan. This is the Çqá'paha and was regarded as populous. Doubtless of Tanoan stock.

Three miscellaneous Pueblo clans, including one from a Rio Grande pueblo, one from near Jemez, and another clan mentioned as potters and basket-makers.

Six of unknown origin.

We may safely assume, I think, that at this period the language as well as the institutions and industries of the Navajo underwent the greatest and most rapid change. Dr Matthews has determined, by careful comparison with northern Athapascan vocabularies, that the original Navajo was remotely connected with the same stock. The adoption of the Pueblo* potters, basket-makers, and weavers taught them new arts, but the introduction of sheep, which made them a pastoral people, evidently tended to cause their basketry and pottery industries to decline, yet advanced the art of weaving among them even beyond that of their Pueblo teachers. So with the language of the tribe: It is known that on the arrival of the important Çqá'paha no evidence of relationship between that people and the Navajo was discernible; so the two bodies dwelt apart, but on friendly terms, for twelve years ere the Çqá'paha were received into the tribe. Now, as to the difference in language of the two divisions. In his outline of the tradition Dr Matthews remarks:

"Up to this time all the old gentes spoke one common tongue, the old Navajo; but the speech of the Çqá'paha was different. In order to reconcile the differences, the chief of the Tsinajíni and the chief of the Çqá'paha, whose name was Gð'tso, or Big Knee, met night after night for many years to talk about the two languages and to pick out the words of each which were the best. But the words of the Çqá'paha [according to a member of that clan] were usually the plainest and best, so the

*The original Navajo, indeed, judging by their name, "House of the Dark Cliffs People," appear to have been a pueblo people, or at least cliff-dwellers, although not potters nor basket-makers.

present Navajo language resembles more the old Çqá'paha than the old Navajo."

The effect of the language of the newly incorporated clans on the "old Navajo" prior to the Çqá'paha accretion was probably very slight, as the new clans were small. We find, however, that the effect of the Çqá'paha tongue on that of the Navajo was great—so great, indeed, that it may be traced even today. This fact is mentioned as tending to show that had not the Navajo, prior to the Çqá'paha accession, been a very small tribe this newly adopted people could not have made a lasting impression on the Navajo language. Dr Matthews is evidently of the same opinion regarding the former insignificance of the tribe, for he says: "The myth speaks of these cliff-dwellers as gods; but it is not difficult to believe that the rude Athapaskan wanderers, in the days when they subsisted on small mammals, such as prairie dogs, and on the seeds of wild plants (as their legends relate), may have regarded the prosperous agricultural cliff-dwellers as gods."* In this connection it also should be mentioned that Big Knee's people wandered in the country of the Navajo for eighteen days before any of the latter people were encountered.

From a study of the early history of the southwestern Athapaskan and neighboring tribes, one is at once convinced that the Apache group, at present much smaller, but always more aberrant, than the Navajo tribe, were of such little importance until after the middle of the seventeenth century that they occupied a very limited and not definitely determinable area; that by the continual addition of small bands of foreign or kindred peoples during the succeeding few decades, in a manner similar to the various Navajo adoptions, their importance to the surrounding tribes gradually increased with their numbers, and their aggressiveness with both.

About the time of the adoption of the first three Apache clans who had come from the south, and their organization into a phratry of the Navajo, the first known Spanish reference to the Apache tribe was made by Juan de Oñate.† This was in 1598.

*Some Illustrations of the Connection between Myth and Ceremony, *Memoirs Int. Cong. Anthropol.*, Chicago, 1894, p. 249.

† Oñate, Obediencia y vasallaje de San Juan Baptista, 1598, in *Doc. Int'd. de Indias*, xvi, p. 114: "Todos los Apaches desde la Sierra Nevada hacia la parte del Norte y Poniente." Farther on, after speaking of the Jemez: . . . "y mas, todos los Apaches (sic) y Cocoyes de sus sierras y comarcas."

The Apache then resided in the "Snowy mountains" of New Mexico, probably not more than seventy-five miles south of the San Juan home of the Navajo, and not in the southern country, in the White mountain section northward from the Gila—the *despoblado*, or uninhabited region, as Coronado's chroniclers aptly termed it. I believe that if any Apache were in the southern country in the sixteenth century they were about the headwaters of the Gila, in the present New Mexico, where Benavides found them 30 leagues (80 miles) from Senecú, and where, indeed, a missionary is said to have established himself as early as 1628. It appears more likely, however, that the Apache, like the Navajo, gradually increased in population, and about the date last given had already become broken up into bands, mainly for hunting purposes, which were termed Apaches de Xila (Gila) and Apaches Vaqueros (buffalo-hunters). The Navajo were now classed with the Apache, and are for the first time called Apaches de Navajo.*

When in 1539 Niza crossed the desert between the Gila and Cíbola, the present Apache country, he encountered no resident strangers, nor were any seen either by Coronado or Jaramillo in the year following. None of these chroniclers, moreover, mention any difficulty existing between the Zúñi and Apache or any other people in the south except the villagers formerly at Marata, or indeed between the Apache and the various Piman tribes—inveterate enemies in later times. Had the Apache been in this section the narrators could not have failed to notice them. The only suspicion of the occupancy of the southern Arizona country by the Apache is that aroused by a statement of Castañeda to the effect that in the region round about Chichilticali—which Mr Bandelier has placed "where now is Fort Grant, on the south of the Rio Gila, near the Arivaypa"—dwelt a "gente mas barbara de las que bieron hasta alli biuen en rancherias sin poblados biben decasar y todo los mas es despoblado."†

If Mr Bandelier's determination of the location of Chichilticali is correct, and there can be no reason for doubting its accuracy, then that ruin must have been in the heart of the Sobaipuri

* See Bancroft, *Arizona and New Mexico*, pp. 162, 163, 1889.

† Through the courtesy of Mr George Parker Winship, of Harvard University, I have been enabled to consult his copy of the narrative of Castañeda, now in Lenox library, New York city, as well as kindred documents which, with English translations and copious notes, will shortly be published. All references to unpublished documents throughout this paper were made possible by Mr Winship's generosity.

country, and these or the congeneric Opata were in all probability the savages to whom Castañeda alludes. The Sobaipuri during the mission period occupied San Pedro, Santa Cruz, and Arivaipa valleys and the adjacent part of the Gila. They were driven from their stronghold by the Apache in 1762 and forced to join the Papago, of whom they were a direct offshoot.* The fact that they are referred to as dwelling in isolated cabins, as being savage, and as living by the chase, is not at all surprising; indeed, these characteristics pertained quite as well to some of the early Piman tribes as to the later known Apache. The following remarks of the Viceroy Mendoza † support this belief in part: "Melchior Diaz says that the [Piman] peoples whom he found along the way *do not have settled location anywhere* except in one valley, which is one hundred and fifty leagues from Culucan, which is settled and has houses with platforms, and that there are many people along the way, but that they are not good for anything except to make them Christians."

The early writings concerning the Piman tribes are replete with references to their intertribal warfare. Castañeda records that these people were "all at war with one another." The name of the Opata, a tribe of Piman stock, signifies *enemy*, and was applied to them by their kindred, the Pimas Altas. The ferocity of the Piman tribes at this early date is further demonstrated by their destruction, in 1541, of the newly established Spanish town of Corazones. Jaramillo calls attention to the fact that "at first the Indians [Pimas of Sonora valley] were peaceful and afterwards not, but instead they and those whom they were able to summon thither *were our worst enemies*. They have a poison with which they killed several Christians." This chronicler speaks of no Indians, hostile or otherwise, in the vicinity of Chichilticali, although he mentions the trivial circumstance of having seen, a few days later, an Indian or two at his Rio Vermejo (the Colorado Chiquito), "who afterwards turned out to be from the first settlement of Cibola." Concerning this neighborhood, Coronado, ‡ shortly after his arrival at Cibola, says: "No Indian was seen for the first day's march [from Chichilticali toward Cibola], after which four Indians came out with signs of peace, saying that they had been sent to that desert place to say

* Bourke in *Jour. Am. Folk Lore*, III, p. 114, 1890. Bandelier, Final Report, part 1, p. 102, 1890.

† Letter to the King, April 17, 1540.

‡ Letter to Mendoza, August 3, 1540.

that we were welcome, and that on the next day all the tribe would provide the whole force with food. The army-master gave them a cross, telling them to say to the people in their city that they need not fear, and that they ought to have their people stay in their own houses."

Coronado could not have been mistaken in these Indians. They were, as he thought, men of Cibola, and they were prepared for him when, some days later, he reached that place and found the houses at Hawikuh defended by the natives, the roofs being abundantly supplied with stones, which were freely and effectually used by the Indians against these first white invaders.

Castañeda does not mention, in his account of Coronado's journey in advance of the main army, anything concerning a wild tribe having been seen in the locality under consideration. He merely remarks that Chichilticali "had been built by a civilized and warlike race of strangers who had come from a distance."* He, however, describes Gallego's journey from Culiacan to meet Coronado, having traveled a distance of 200 leagues "with the country in a state of war and the people in rebellion, having encounters with them every day, although they had formerly been friendly towards the Spaniards."†

The statement of the *Relacion del Suceso* also is opposed to the theory of the occupancy at this early date of the southern Arizona country by the Apache. This anonymous document relates: "This whole way [from Culiacan] up to about 50 leagues before reaching Cibola is inhabited, although away from the road in some places." It is gathered from this that in 1540 the Piman settlements were as continuous toward the northeast as they were just before the Sobaipuri became extinct as a tribe. The occupancy of the country the entire distance from the south left no place for the Apache, who have always been regarded as the hereditary enemy of the Piman tribes.

The circumstances attending the return of Coronado's army in 1542, after leaving Cibola, were similar to those of the journey northward. The wilderness or *despoblado*, the present White Mountain Apache country, Castañeda says, "was crossed without opposition;" but when the troops departed from Chichilticali to make their way into Sonora—that is, through the Sobaipuri and Opata country—"in several places yells were heard and Indians seen, and some of the horses were wounded

* *Relacion*, part 1.† *Ibid*, part III, cap. 7.

and killed, until Batuco* was reached, where the friendly Indians from Corazones came to meet the army and see the General. They [the Eudeve and Nevome] were always friendly and had treated well all the Spaniards who had passed through their country."†

The Casa Grande of the Gila and the other extensive but now ruined pueblo structures of Gila and Salado valleys are claimed by the Pima to have been the homes of their ancestors. The destruction of these settlements, however, is not attributed by them to the Apache, but indefinitely to "enemies who came from the east in several bodies," and who compelled their abandonment; "but the settlements at Zacaton, Casa Blanca, etc., still remained, and there is even a tale of an intertribal war between the Pimas of Zacaton and those of Casa Blanca after the ruin of Casa Grande. Finally, the pueblos fell one after the other, until the Pimas, driven from their homes and, moreover, decreased by a fearful plague, became reduced to a small tribe."‡ Had the Apache been responsible for this destruction the Pima could not have failed to note it in their tradition.

This subject has been dwelt on thus extendedly in order to show that the statement of Castañeda concerning the "gente mas barbara" might have referred rather to one of the Piman tribes, notably the Sobaipuri or Opata, than to the Apache, and consequently that the Apache were not in southern Arizona or northern Sonora at this early date.

Indications of Apache and Navajo § hostility toward the

* There were two villages of Batuco, one occupied by the Tegûis division of the Opata, the other by the Eudeve. The latter, situated on the Rio Montezuma, a tributary of the Yaqui, in latitude 29°, was the first village of the Eudeve going from the north after passing through the country of the troublesome Opatas, and is the Batuco referred to by Castañeda.

† Castañeda, *Relacion*, part III.

‡ Bandelier in 5th Ann. Rep. Arch. Inst. Am., pp. 80, 81, 1884. The eastern enemies referred to may have been the Toboso, a very warlike tribe, formerly of the lower Rio Grande. This long range is not at all improbable, as even the Comanche from Texas raided Piman rancherias during the present century.

§ I do not use the terms Apache and Navajo in the same sense as did many of the earliest writers and cartographers, who referred to the latter as the Apaches Navajos or Apache de Navaio. The name Apache is probably of Yuman origin, the term *i-patch* being the Kuchan and Maricopa name for "man." Navajo is possibly from the Spanish *navaja*, a knife, properly a clasp-knife, and I am informed by Mr James Mooney that the name was evidently applied to this people because in former times they were accustomed to carry long stone knives, the simulation of the action of whetting which was their tribal sign in Indian gesture speech. The Spanish term *navajo* signifies a pool; also a level piece of ground.

Pueblos appear in history about a quarter of a century after they became known to the Spaniards, for in 1622 the missionary field was enlarged through endeavors to approach the Navajo and Apache. "They were successful only for a short time, but saved the tribe of Jemez from utter destruction by those hereditary foes of all civilization. The villages of the Jemez had already been abandoned in consequence of the forays of the Navajos,"* although not many years afterward the Apache appear in the rôle of allies of the Jemez, Tewa, and Piros against the Spaniards.†

The pueblos in closest proximity were naturally the first prey of the Apache and Navajo; consequently Jemez, the westernmost of the Rio Grande villages, hence the nearest to the Apache group in northwestern New Mexico, was the first to suffer. Emboldened by their success, their incursions were extended to other directions, and as the tribe grew they conducted their depredations more successfully by dividing into bands, which later became known by the names of the country forming their respective ranges, as Pinaleño, White Mountain, Chiricahui (improperly called Chiricahua), Gileño, etc., or from some personal characteristic, as Mescalero, Coyotero, Vaquero, etc.

The effect of these depredations on the life of the Pueblos was very great. At the time the Apache appear in history many of the village Indians, notably the Jemez, Zúñi, and Sia, dwelt in several scattered towns situated mainly with reference to convenience to the fields. So far as is known, none of the Pueblos west of the Rio Grande were molested by warlike nomads prior to the seventeenth century, although the sedentary Acoma, according to Castañeda, "were robbers, feared by the whole country round about."‡ On the Rio Grande proper, however, seven villages had been visited and destroyed prior to 1540 by Indians "who painted their eyes, and who lived in the same regions as the cows [buffaloes], and that they have houses of straw and corn."§ Who these warlike plains tribes were matters little in the present paper. There is no evidence, however, that they were Apache, although it has been asserted that Coronado's

* Bandelier, after Benavides and Vetancourt, in *Doc. Hist. Zúñi Tribe*, *Jour. Am. Eth. and Arch.*, J. Walter Fewkes, editor, vol. III, p. 95, 1892.

† Bancroft, *Arizona and New Mexico*, p. 167 et seq., 1889.

‡ *Relacion*, part I.

§ Alvarado, *op. cit.*

Querechos were identical with the later Apaches Vaqueros. Mr James Mooney, during a long period of study among the plains tribes, has discovered that Querecho is an old Comanche name of the Tonkawa, who ranged the buffalo plains of western Texas and eastern New Mexico.

Although the western Pueblos apparently enjoyed immunity from predatory enemies, yet they had defensive structures. As the Zuñi, for instance, for reasons above given, could not have been molested at this early date by the Apache and Navajo, and as they were much too far from the plains tribes to have been harassed by them, we must look in another direction for the meaning of their defensive structures. I think it will not be denied that nearly if not quite all the Pueblos are composite peoples, the component bodies having belonged to different stocks and having migrated from different directions, in a manner similar to the various gentile groups of the Navajo, so thoroughly set forth by Dr Matthews, as Dr Fewkes has well shown was the case of the Tusayan,* and as is well known to be the case of the modern pueblo of Laguna. Yet these peoples had their intertribal broils, and villages were divided in consequence.† Thus may be accounted for the defensive character of the Zuñi pueblo of Matsaki, of which Castañeda‡ says :

"In this village particular houses are used as fortresses. They are higher than the others and set up above them like towers, and there are embrasures and loopholes in them for defending the roofs of the different stories, because, like the other villages, they do not have streets, and the flat roofs are all of a height and are used in common. The roofs have to be reached first, and these upper houses are the means of defending them. It began to snow on us there and the force took refuge under the wings of the village, which extend out like balconies, with wooden pillars beneath, because they generally use ladders to go up to those balconies, since they do not have any doors below." Such a village might have withstood an Indian siege, but how long it would have taken the Spaniards to capture it may be answered by the fate of the Zuñi pueblo of Hawikuh, into which had as-

* Fewkes, "The Kinship of a Tanoan-speaking Community in Tusayan," *Am. Anthrop.*, Apr., 1891. "The Kinship of the Tusayan Villagers," *Ibid.*, Oct., 1894

† See, for instance, Fewkes in *Am. Anthrop.*, vi, p. 363, who shows how the pueblo of Awatohi was destroyed by other Tusayan villagers.

‡ Relacion, part i.

sembled the entire warrior population of a tribe of some 3,000 souls, when Coronado compelled its surrender within an hour with 75 companions on horseback and 30 footmen,* notwithstanding "the crossbowmen broke all the strings of their crossbows and the musketeers could do nothing, because they had arrived so weak and feeble that they could scarcely stand on their feet."† Such a poor stand against Coronado's weakened little force shows quite clearly that the Zuñi were unaccustomed to predatory warfare, for they knew of the advance of the Spaniards and were prepared to meet them.‡ This, however, was not the case of the Pueblos on the Rio Grande, who were exposed to the Comanche and Tonkawa particularly; for, although Coronado's army stormed Tiguex and cruelly butchered hundreds of innocent natives, they held their village against the whites for fifty days, when an armistice was declared.

Such was the condition of affairs in the sixteenth century. In 1622, as above cited, the Jemez were compelled to abandon their villages on account of Navajo raids from the northwest; in 1670, Hawikuh, one of the two most important of the six Zuñi villages and the southwesternmost of the group, was completely abandoned on account of Apache depredation, and within five years from that time the six villages of the Salinas east of the Rio Grande, including the famous Tabirá, or "Gran Quivira," were also destroyed and their inhabitants compelled to seek refuge among their kindred along the lower Rio Grande.

For nearly two hundred years after the coming of Oñate the history of the Pueblo tribes is one of Apache rapine. In 1680, soon after the destruction of the Tiwa and Piro pueblos of the Salinas, began the great Pueblo insurrection against Spanish authority, which, strictly speaking, continued until 1692. To what extent the Pueblos were harassed by the Apache during this hiatus in Spanish sway there is of course no record, but after the revolt we do not find the old villages reconstructed in their former unprotected situations; but, on the contrary, each tribe, who occupied several villages before the rebellion, now erected

* This is according to the *Traslado de las Nuevas* (1540). The *Relacion del Suceso* says 80 horsemen, 25 foot soldiers, and some part of the artillery. Jaramillo says 70 horsemen.

† Coronado's letter to Mendoza, August 3, 1540.

‡ The Zuñi are termed *Sara-ide*, "cowards," by the Tiwa of Isleta. It is the only name by which they are known among that people.

and dwelt in a large communal structure. Such, for example, is the present Zuñi. Today, with but two exceptions, no pueblo in New Mexico occupies the site it held in the sixteenth and early in the seventeenth century,* or before, let us say, the inception of Apache invasion. The exceptions are Acoma and Isleta. The former pueblo occupies the mesa which it held when Coronado passed through the country. The reason is plain: the mesa was not continuously occupied on account of its impregnable character, but because of the inexhaustible water supply for domestic use in a natural cleft near the summit. While Isleta stands on its prehistoric site, as determined by Mr Lummis, the habitancy of the pueblo has not been continuous.

We may now properly assume, I think, that selection of village sites by the Pueblos prior to 1680 was made mainly with reference to convenience in their agricultural pursuits, which depended on irrigation—that is, the selection was environmental and not made with regard to predatory enemies (although the defensive motive, on account of intertribal difficulties, entered into the construction); and from 1680 until the subjection of the Apache and his Navajo cousin—the period of the single communal village—pueblo architecture, if not site selection, became seriously affected by the incursions of these aberrant tribes. In view of this fact, then, one may, in these days of absolute freedom from Apache raids, look for a further change—the segregation of the single village into many small villages similar to those occupied when the Spaniards first came. This transition is already in progress. Laguna† is being gradually abandoned, and what were its summer villages a few years ago are now permanently occupied; likewise at Zuñi, where Nutria, Pescado, and Ojo Caliente, farming settlements a decade ago, are now inhabited the year around, and most new houses at Zuñi proper are built a short distance away from the great hive rather than as additions to it.

The etymology of the name Tusayan, as generally interpreted, makes it at first appear that the Hopi came in contact with the Navajo or Apache early in the sixteenth century, and that the

* Bandelier, Final Report, I, p. 34. Lummis, Man Who Married the Moon, p. 54.

† Laguna Indian Villages, in *Am. Anthropol.*, October, 1891, p. 345.

name reached the Spaniards indirectly through one of these Athapascan tribes. This term, as applied to the Hopi country, became known to history in various forms in 1540, when the Zuñi informed Coronado of the existence to the northwestward of a province of that name containing seven towns. Several attempts to determine the etymology of the name have been made. Dr Matthews suggests the Navajo *To'caiya*, "water under the sand;" *To'tse'ya*, "water under the rocks," and *Čusaá'* ($\check{c} = t\check{c}$), "lying on top," said of something lying on a shelf. The last name is in part applied to a hill which the Navajo call *Dsil-časaá'*, and which is recorded on the more recent maps as *Zilh Tusayan*. Captain Bourke gives *Tuslanapa*, *Tusla*, *Tuslango*, *Tu-sahn*, and finally *Tusayan*, the somewhat elastic name of an Apache clan, signifying "plenty of water." According to Mr Cushing, the Zuñi name of a former group of pueblos at or near Tusayan proper was *Usaya*. The similarity in the Athapascan terms given by Dr Matthews and Captain Bourke to the name *Tusayan* as applied to the Hopi tribal range seems to be fortuitous, especially when their etymology is analyzed. *Usaya* was evidently the Zuñi form of *Aša*, the native name of the important Tansy Mustard clan and phratry of the Hopi, whose "valley" is mentioned in the writings of Espejo in 1583 as *Asay* and *Osay*. This element in the name *T(usay)an* is quite apparent. The failure of the Spaniards to meet the Apache or Navajo until 1598 renders it impossible for the name *Tusayan*, as applied in 1540 to the Hopi tribal range, to be of Athapascan origin, notwithstanding the appropriateness of some of the terms suggested. Even if the Zuñi and Navajo had intercourse at this early day, the former, in all probability, would not have borrowed the Navajo name of the Hopi country. There was frequent intercourse between the Zuñi and Hopi at this date, the former obtaining most, if not all, of their cotton from *Tusayan*.

From the foregoing discussion the following conclusions are drawn:

1. The creation and migration tradition of the Navajo is remarkably accurate regarding the chronologic sequence of the events recorded therein, as attested by historical comparison.

2. The appearance of the ancestors of the Navajo tribe in San Juan valley not earlier than the latter part of the fifteenth century is established beyond reasonable doubt.

3. The original Navajo, being remotely of Athapascan stock and making their appearance at the time given, were probably a cliff-dwelling people. As the first accessions from the Apache were not made until many years after the advent of the primal couple in the San Juan region, the Navajo cannot be regarded as an offshoot of the Apache, as previously supposed. ✓

4. At the time the Navajo appeared in the southwest the Apache were already there, forming, as judged from the various branches thereof which joined the Navajo at an early date, a more populous body than the Navajo; but each of these tribes was very insignificant in point of population.

5. The Apache did not occupy the region of southern Arizona or northern Sonora nor the plains of Texas in the middle of the sixteenth century, but more probably limited areas in north-western and southwestern New Mexico.

6. The Navajo were a composite people even before the eighteenth century, the tribe then embodying remnants of the Athapascan, Tanoan, Keresan, Zuni, Shoshonean, Yuman, and possibly other Indian linguistic stocks, in addition to a slight admixture of Aryan.

7. Owing to their weakness and consequent lack of aggressiveness, the Navajo and Apache did not molest the Pueblo tribes prior to the seventeenth century.

8. The Navajo acquired their first flocks and herds through the Pueblos soon after 1542, an event which changed their mode of life and formed an epoch in their tribal history.

9. The accession of at least one foreign clan by the Navajo had a marked effect on the language of the tribe—a fact that should be considered in the classification of all linguistic groups.

10. The defensive character of at least the western pueblos previously to 1680 was due not to predatory nomads, but to intertribal broils.

11. The time of the abandonment of Niza's province of Marata is established with reasonable accuracy.

12. The village of Kintyèli in Chaco cañon was built shortly after 1542.

13. Indian tradition, when preserved in a manner that insures approximate accuracy of detail, particularly as regards numbers and chronologic sequence, and when recorded without interpolation and carefully employed, may be used to substantiate historical events.

14. Indian tradition, although apparently bearing evidence of great antiquity, may be of very recent origin.

RELATION OF SOCIOLOGY TO ANTHROPOLOGY

BY LESTER F. WARD

Almost any subject may be classified in more than one way. Anthropology is the science of man, and taken in its broadest sense it embraces everything that concerns the human race. It first received prominence at the hands of Paul Broca, the eminent student of man in his physical relations. Owing to his influence, it was long restricted to the study of the human body; but so appropriate a term could not be thus bound down, and to-day it has come to receive the broadest meaning of which it admits. The Anthropological Society of Washington, which was founded in 1879, introduced into its constitution the following classification of the science:

1. Somatology; 2. Sociology; 3. Philology; 4. Philosophy; 5. Psychology, and 6. Technology. These subdivisions were adopted, after prolonged and careful consideration, by such men as Maj. J. W. Powell, Director of the United States Bureau of Ethnology, Colonel Garrick Mallery, the eminent student of sign language and kindred subjects, and Prof. Otis T. Mason, Curator of Ethnology for the United States National Museum. It has been found during sixteen years' experience that every subject proper to be brought before the Society could be classed under some one of these heads.

Here, as will be seen, sociology is made a subdivision of anthropology, and properly so; but this does not in any way invalidate an entirely different classification in which sociology is made the generic science, and anthropology is looked upon as in some sense a part of sociology. It all depends upon the point of view. As man is the being with whom sociology deals, that science, of course, belongs to the science of man; but if we look upon sociology as embracing everything relating to associated man, a large part of the facts and phenomena of anthropology overlap upon its domain, and it becomes important to consider the relations subsisting among these phenomena. Moreover, the phenomena of association are not exclusively confined to

man. Sociologists are coming to pay more and more attention to phenomena among animals analogous to those displayed by men, and animal association is a well-known fact which is receiving increased attention; so that sociology is not wholly included in any view of anthropology.

But when we examine the two sciences closely we perceive that they differ generically. Anthropology, in dealing with man—*i. e.*, with a particular being or species of animal—is primarily a descriptive science. It is not concerned with laws or principles, but with material facts. Sociology, on the contrary, deals primarily with association and whatever conduces to it or modifies it. But association is not a material thing; it is a condition, and the science that deals with it is chiefly concerned with the laws and principles that produce and affect that condition. In short, while anthropology is essentially a concrete science, sociology is essentially an abstract science. The distinction is very nearly the same as between biology and zoölogy, except that anthropology is restricted to a single species of animal. Thus viewed, it is clear that it becomes simply a branch of zoölogy with classificatory rank below ornithology, entomology, mammalogy, etc. There is no other single species or even genus that has been made the subject of a distinct science, as might obviously be done—*e. g.*, hippology, the science of the horse, or cynology, the science of the dog.

It comes, however, wholly within the province of social philosophy to inquire into the nature of this being, man, whose associative habits form the chief subject of sociology. First of all, his position in the animal world needs to be understood. No possible good can come from ignoring the true relations of man to the humbler forms of life around him, while, on the other hand, if this relation is correctly understood, it furnishes one of the principal means by which man can learn to know himself. Accepting, therefore, the conclusions of the masters in zoölogy, among whom, as to the main points, there are no longer any differences of opinion, we must contemplate man simply as the most favored of all the "favored races" that have struggled up from a remote and humble origin. His superiority is due almost exclusively to his extraordinary brain development.

Very few have seriously reflected upon the natural consequences of this one characteristic—a highly developed brain.

Without inquiring how it happened that the creature called man was singled out to become the recipient of this extraordinary endowment, we may safely make two fundamental propositions, which tend to show that this question is not as important as it seems. The first is that if the developed brain had been awarded to any one of the other animals of nearly the same size of man, that animal would have dominated the earth in much the same way that man does. The other is that a large part of what constitutes the physical superiority of man is directly due to his brain development.

As to the first of these propositions, it is true that man belongs systematically to the highest class of animals, the placental Mammalia. It would have looked somewhat anomalous to the zoölogist if he had discovered that the dominant race to which he belonged must be classed below many of the creatures over which he held sway, as would have been the case if the organ of knowing had been conferred, for example, upon some species of large bird or reptile; but in fact something a little less anomalous, but of the same kind, actually occurs. The line along which man has descended is not regarded by zoölogists as by any means the most highly developed line of the mammalian class. It is a very short line and leads directly back through the apes and lemurs to the marsupials and monotremes, animals of much lower systematic order, the last named forming a partial transition to birds. Most of the other developed mammals, such as the Carnivora and Ungulata, have a much longer ancestry, and have really attained a far higher stage of development. In the matter of digits it is maintained that true progress is characterized by a reduction in their number, and that the highest stage is not reached until they are reduced to one, as in the horse. In this respect man is a slight advance upon the apes in having lost the thumbs of his feet. No one can deny that the power of flight would have been an immense advantage to man, yet few mammals possess this power, and it is chiefly confined to creatures of low organization.

It is difficult to conceive of a being entirely different in form from man taking the place that he has acquired; but if any one of the structurally higher races possessed the same brain development it would have had the same intelligence, and although its achievements would doubtless have been very different from

his, they would have had the same rank and secured for that race the same mastery over animate and inanimate nature. This will become clearer when we consider the second of the above propositions, which we may now proceed to do.

To what extent has brain development reacted upon man's physical nature? I cannot, of course, go fully into this question here, but nothing is better known to anatomists than that the erect posture is not the natural or primary one. It has been acquired by man within comparatively recent time. It is a legitimate inference that it is chiefly due to brain development: physiologically as a means of supporting the enlarged and correspondingly heavier head, which it would be difficult to carry in the horizontal position, and psychologically as the natural result of a growing intelligence and self-consciousness, which seeks to lift the head and raise it to a position from which it can command its surroundings. It is a common observation that those persons who possess the greatest amount of self-esteem stand straightest, and it is this same principle that has operated from the beginning to bring the human body more and more nearly into a vertical position.

Pari passu with this process has gone on the diminution of the craniofacial angle. The same influences that tended to raise the body from the horizontal to the vertical position tended also to carry the brain and upper part of the face forward and the jaws and mouth backward. It is not claimed that this reaction of the developing intelligence upon the physical form is sufficient alone to account for the development of the entire type of physical beauty attained by the most advanced human races. Esthetic considerations are needed to complete the process, and especially the powerful aid of sexual selection; but even the sense of beauty must be in great part ascribed to mental increase and refinement.

Nothing is more certain than that the faculty of speech is a product of intelligence. Both by direct effort and by hereditary selection the organs of speech received increment after increment of adaptation to this end. The means of intercommunication was the indispensable requirement, and this would be secured by any intelligent creature, no matter what the physical organization might be. Oral speech is by no means the only way in which such intercommunication is secured, and even if no organs had existed by which sound could be produced, some

other means would have been adopted. But man possessed sound-producing organs in common with nearly all animals. There is no evidence that he was specially favored in this respect. In developed man the larynx is more complicated than in most mammals; but this may be comparatively recent. In many animals it is greatly specialized. In birds it is far more elaborate than in man, being double and sometimes, as in the crane, enormously elongated and coiled into a trumpet. Who can doubt that with such an organ all birds could talk if they possessed ideas to communicate? The parrot and many other birds actually do distinctly articulate the words of human speech by imitation, but they lack the power to clothe them with thought. It would be easy to add a great number of other proofs of the all-sufficiency of the one leading characteristic of the human species—his superior brain development—to account for all the important features that distinguish him from the lower animals, but those already mentioned must suffice in this place.

Before leaving the general subject of the relation of man to the lower animals, it may be well to inquire more specifically into the qualities that are alleged to be distinctively human. As sociology deals chiefly with man, it is desirable to arrive, as nearly as possible, at a correct idea of what man is—not the loose conventional idea which, as we have just seen, is not only crude but in great degree false—but a true and fundamental idea, based on attributes that are not superficial, but that lie deep in his essential nature. Even if we are obliged to conclude that there is no direction in which man's superiority is not quantitative rather than qualitative—*i. e.*, a matter of degree rather than of kind—it will be worth while to consider this difference of degree. There are no hard and fast lines in nature, and the greatest leaps that seem to have been taken in cosmic evolution are such only when statically considered, and blend together when viewed in their dynamic or historical aspects.

Nothing is more frequently met with in literature than the statement that some particular quality under consideration constitutes an essential distinction between man and the lower animals. I have for many years been accumulating such statements, most of which readily yield to analysis. A few, however, are worthy of serious consideration, and we shall see whether

the claim that there exists anything distinctively human can be regarded as established. It is difficult to classify all these alleged distinctively human attributes in any logical order. I shall exclude, except in their collateral bearings, all physical differences and confine myself to those which can be called mental in the broad sense of the word. Thus circumscribed the natural subdivision would seem to be into affective and intellectual qualities; but in attempting such a subdivision I encounter many difficulties arising out of the interaction of these two great departments of the mind. Indeed, from what has already been said, it is obvious that the great distinction is intellectual, and that the developing intellect has reacted alike upon the physical form and the nervous system (sensory and emotional apparatus). If I were simply continuing the preceding argument and seeking to show that increased brain development is adequate also to account for observed psychic modifications I should, of course, reverse the order here employed; but that would perhaps be too much to prejudge the case. I shall therefore consider the lower faculties first and endeavor to rise successively in the scale.

One of the most modest claims is that of Comte, that it is only in man that we find the purely vegetative functions of life subordinated to the distinctively animal functions. The lower animals and, as he admits, the lowest types of men, according to this view, simply vegetate—*i. e.*, they do nothing but live—while the higher types of men not only live, but live for something, are conscious of living, which, he says, is the noblest conception we can form of humanity as distinct from animality.*

It is easy to see that he here refers to feeling as an end of life, but the same logic which prevents him from recognizing psychology as distinct from biology debars him from saying this in so many words.

Man is said to be the only animal that laughs, and if we restrict laughter to the modifications made in the facial muscles, this distinction is one of the most complete of all that have been insisted upon. But every one knows that the eye is strongly expressive of the sense of amusement, and certain animals, as the dog, express emotions with the eye that are closely akin to mirth. But men laugh from a number of motives, among which

* Phil. Pos. III, 1869, p. 494.

are joy and gladness, and it is these last that animals chiefly manifest. The psychologic basis of wit and humor is something very different from this, and belongs to the intellectual group of characteristics.

Crying, in the sense of a vocal manifestation of the sensation of pain, is, of course, common to man and most of the higher animals. Reptiles, and even fishes, also occasionally utter such sounds; but in the sense of weeping, usually accompanied by the shedding of tears, crying is as exclusively a human attribute as laughing. Schopenhauer, than whom no one has more acutely analyzed the mind, denies that we ever weep from the pain experienced, but only from its "repetition in reflection," and he defines weeping as "sympathy with one's self or sympathy reflected back upon its source."*

Sympathy proper—i. e., sympathy for others, to which the last remark seems to lead—is certainly not an exclusively human affection. While it may be a question whether the defense of their young by nearly all animals is anything more than an instinct developed through natural selection for the protection of races, neither is it certain that the same instinct manifested by the human mother rises far above this. The pure article is therefore to be looked for between individuals that are not bound together by such powerful ties of interest; but there are many accounts of what seems like genuine sympathy on the part of dogs, and it is even less doubtful in the case of monkeys.

Sympathy, as the word implies, is a real though representative feeling, usually painful, and consists of a "realizing sense" of suffering in another being. There are two prerequisites to the existence of sympathy, viz., the experience of a similar pain to the one sympathized with, and the power of recalling the sensation experienced. Still another condition might be added, which is distinct from these. The creature sympathizing must be able to derive from the facts observed an idea that the creature sympathized with is suffering pain. This last condition is a form of reasoning, while the remembrance of past painful states requires some degree of perfection in the structure of the brain. It is not therefore to be wondered at, that only the highest animals are capable of manifesting sympathy.

* Welt als Wille u. Vorst., Leipzig, 1859, Vol. I, p. 444.

The question whether sympathy increases with intelligence has been much discussed. To those who hold that it does so increase, it has been answered that among enlightened people it is not the most intelligent who manifest the most sympathy; that philosophers and wise men are often not sympathetic, while many women not possessed of abundant wisdom are intensely so. I have never felt that this was a sufficient answer, and if this were the proper place I would attempt to point out its fallacies; but as it does not directly bear upon the question of sympathy in animals, it must suffice to refer to the patent fact that altruism has steadily increased with the progress of civilization—*i. e.*, true sympathy is almost directly proportional to intelligence.

The quality which is of course most frequently referred to as peculiar to man is what is commonly called the moral sense. It is believed by many that man possesses a special faculty by which he can unerringly distinguish right from wrong. This, of course, represents a crude stage of philosophy, in which observation plays no part. But some very respectable philosophers have maintained that there is an abstract right and wrong which may be known and upon which a science of pure ethics can be based. Not to speak of Kant's rather obscure statement of this doctrine, it is worth noting that Herbert Spencer set out from this point of view and defended it in his *Social Statics*, but in his later works repudiated it as not sustained by the great body of facts that he had gleaned from the history of all races.

Paley maintained that the power to distinguish good from evil grew out of the expectation of reward and punishment, and Darwin has shown that the moral sense as thus defined certainly belongs to some of the higher animals. In most civilized men the "categorical imperative" is so strong that it is no wonder that it should be regarded as a special endowment of human nature; but every one knows in his own experience with the world that there are many fully civilized men who lack the ethical sense on certain subjects, even though it may be fully developed as regards all others. Who, for example, does not know certain persons who make it a principle of life never to surrender money until compelled, whatever may be the obligation to do so? The saying that "if you wish to make an enemy of a friend, lend him money" is based on the common

observation that a full moiety of mankind consider it a hardship to have to return money that they have borrowed and used without giving any equivalent. This is only one of a long list of bad traits in human nature, these being simply cases in which the ethical sense is not fully developed. So prevalent is this that it is a common remark that one only occasionally finds a person who is thoroughly upright in all matters. There is a "screw loose" somewhere in almost every one, so that it is considered necessary to praise one who always does as he should do.

Bishop Whately strikes the keynote in the parenthetical part of the following remark: "The moral faculty, or power of distinguishing right from wrong (which appears also to be closely connected with abstraction, without which it could not exist), is one of which brutes are destitute."*

It is probably true that brutes are destitute of the power to represent the pains of others to any great extent, and it is this power that forms the basis of the moral sense; yet I have myself frequently observed in the case of dogs which I knew had never themselves been shot, but had seen many other animals killed and wounded by shooting, that they always recoil when a gun is pointed at them. They certainly must *conclude* that the gun if discharged when pointed at them will produce the same effect on them that it does on other animals. There is no room for instinct or automatism here, and I cannot doubt that they actually represent to themselves the pain that they see wounded animals manifest. What impressions they may derive from the frequent sight of animals thus rendered lifeless is only a matter for speculation, but there is no doubt that one of the first facts about which a dawning intellect would reflect is death.

We may next consider the faculty of volition. Says Dr Carpenter: "Whilst we fully recognize the possession by many of the lower animals of an intelligence comparable (up to a certain point) with that of man, we find no evidence that any of them have a volitional power of *directing* their mental operations at all similar to his."† It is not, of course, denied that animals possess will and are governed by it in their actions,

* Logic, Appendix No. 1, § xxiii, American edition, 1854, p. 253.

† Mental Physiology, p. 105.

but it is supposed that man has a power, not possessed by them, of deciding among many conflicting motives which one to obey. This need not necessarily involve the acceptance of the doctrine of free will in the popular sense. Schopenhauer, who, while defending a form of that doctrine, denies the *liberum arbitrium indifferentiæ*, remarks :

“Although animal and man are determined with equal necessity by motives, man possesses over the animal a perfect power of choice (*Wahlentscheidung*), which is often regarded as a freedom of the will, although it is nothing but the possibility of a fully fought out conflict between several motives, of which the strongest necessarily determines his act.” *

A discussion of the question of free will would obviously carry me much too far afield ; but there is one aspect of this question which is so important and so little insisted upon that it may appropriately receive mention. I will introduce it by quoting a passage from that acute thinker, Professor Joseph LeConte. He says :

“There are four planes of matter, raised one above the other : 1. Elements ; 2. Chemical compounds ; 3. Vegetables ; 4. Animals. Now, there are also four planes of force similarly related to each other, viz., physical force, chemical force, vitality, and will. . . . With each elevation there is a peculiar force added to the already existing, and a peculiar group of phenomena is the result. As matter rises only step by step from plane to plane, and never two steps at a time, so also force, in its transformation into higher forms of force, rises only step by step. Physical force does not become vital except through chemical force, and chemical force does not become will except through vital force. . . . I might add still another plane and another force, viz., the human plane, on which operate, in addition to the lower forces, also free will and reason.” †

This just and luminous conception I have myself elaborated in an article on “The Natural Storage of Energy.” ‡ Its application here is this : Every creature, including man, is undoubtedly determined by this concourse and storage of forces, and in this sense a man’s acts are indeed products of his constitution ;

* *Welt als Wille*, I, 350, 351.

† *Pop. Sci. Monthly*, vol. IV, p. 167.

‡ *The Monist*, vol. V, pp. 247-263.

but it is possible to abstract all these antecedent agencies and contemplate man solely with reference to the future. Looked at for just what he is, regardless of how he became so, he appears as a source of independent energy, and in this sense his will is free. But this helps us little to distinguish the human from the animal will, for, except in the degree of this initiative power, the same seems to be true of the one as of the other. Dr Carpenter attempts to draw the line between children and adults; but this is obviously to beg the question, since no age can be fixed at which any wholly new power is added.

The last of the affective faculties to be considered is the sense of beauty. Have animals any esthetic sentiments? Half a century ago this question would have received an almost unanimous negative answer. To-day every well-informed person knows that the true answer is an affirmative one. The two great facts of sexual selection among animals and the cross-fertilization of flowers by insects have abundantly shown that nearly or quite all living creatures have tastes and admire certain forms and colors. Not only is this so, but, while the tastes of animals, like those of men, differ widely, there is a general standard which is substantially the same for both. The ostrich feathers, which are the admiration of the social world, are the products of a sense of beauty in the ostrich. The peacock, the pheasant, and the bird of paradise owe their beauty to sexual selection. The antlers of the stag, that can engage the attention of a Landseer, are secondary sexual characters, utterly useless except as pure ornaments with which to win the favor of mates that have created them by withholding their favors from those in which these ornaments fell below their ideals of beauty. And what is considered more beautiful than flowers? Yet every flower is an expression of some insect's ideal of beauty; otherwise it could never have come into existence. Paleontology teaches that plants with showy flowers appeared on the earth simultaneously with nectar-seeking insects; and the more we study the flowers and insects now living the clearer it becomes that the same process is still going on, determining size, form, color, and fragrance.

But, it may be said, man is the only creature that artificially adorns himself. M. de Quatrefages has laid great stress on this fact, and deservedly so, for, although he did not understand it,

this involves one of the most important principles of both anthropology and sociology. The principle is none other than the one upon which I have so often insisted, that the environment transforms the animal, while man transforms the environment. Though it is much broader in its scope, we may here restrict it to the esthetic sense. Both animals and men possess this sense. The former satisfy it by acts which, in the course of generations, produce physical modifications in their organic structure. The latter, unwilling to wait the slow process of organic change, create the objects of their admiration. Bodily ornamentation is probably the earliest form in which the esthetic sense of man found expression. Strange, grotesque, absurd, and even injurious as this form of art has been in its rudest stages, it is still the product of man's efforts to satisfy whatever sense of beauty he possessed. In the course of its development it at last assumes the form of fine art, and is extended beyond the body and carried into all the great fields of natural beauty. Says Professor Huxley: "Among the many distinctions which have been drawn between the lower creatures and ourselves, there is one which is hardly ever insisted on. . . . It is this, that while, among various kinds of animals, it is possible to discover traces of all the other faculties of man, especially the faculty of mimicry, yet that particular form of mimicry which shows itself in the imitation of form, either by modeling or by drawing, is not to be met with. As far as I know, there is no sculpture or modeling, and decidedly no painting or drawing, of animal origin."*

This is all very true, and it certainly constitutes one of the most trenchant distinctions between men and animals. Its explanation is not far to seek. Having now passed in review all the more important affective attributes, we may next proceed to examine those which belong to the intellectual side of man's nature, in the hope that they may furnish the key to the various questions involved in the class already considered.

First and foremost among these stands the attribute of rationality. Do animals reason? This is the old question, and it must be frankly admitted that the answer which flows from all the facts is an affirmative one, at least so far as concerns the most highly developed animal races, especially those that have been longest associated with man, as the dog and horse. Rats,

* Science and Education Essays, London, 1893, pp. 276-277.

too, which must constantly scheme to escape from man, are exceedingly sagacious. But such wholly wild animals as wolves show scarcely less intelligence, and the wisdom of the elephant is proverbial. Length of life seems to have much to do with it, and to show that acquired experience is utilized as it is by man. Now, if we look over the whole field we find that the several affective attributes above enumerated and numerous others chiefly confined to man, but faintly displayed by certain animals, are confined and ascribed to the same animals that are believed to exhibit the beginnings of reason. Is there a causal connection between the two? I maintain that there is, and that the possession of the affective powers is the direct consequence of the corresponding power of reason. In nearly every case I have discussed I have carried it to the point where this hypothesis not only would apply, but seemed necessary to complete the explanation. We saw that sympathy and the moral sense in general depends absolutely upon a power of representation sufficiently strong to react upon the centers of feeling, and this representative power is purely intellectual. We saw that volition, to rise at all above the mere animal impulse, depended upon a power of choice between motives, which is nothing else than to say that foreseen future or remote benefits influence action more strongly than immediately present ones. This, again, is a form of reason. And finally we saw that artistic production depends upon the power to frame and execute an ideal, and therefore has entirely to do with ideas as distinguished from the mere feelings which actuate the lower animals.

In my *Psychic Factors*, Part II, I have endeavored to set forth the manner in which the rational faculty took its rise, primarily as an aid to the will in better securing the ends of existence, and have then followed its progress through its incipient stages and onward in its remarkable development until it wholly lost sight of this original egoistic function and became the servant of humanity in general, even to the sacrifice of self. And it is in these higher stages that we find the most marked cases of purely human powers—powers of which animals, even the highest, scarcely manifest a rudiment. Language, properly so called, consists of symbols for things, actions, and relations, and these are all rational abstractions. Every name or common noun is an embodied idea and may embrace any number of individuals.

It is doubtful whether any animal could perform the mental operation required in saying dog, horse, mountain, river. All the nouns in an animal's language would be proper nouns, the names of particular dogs, horses, mountains, and rivers. The same would be true of verbs. Indeed, the ruder human languages show a tendency in this direction. The word *go* is a very abstract term, and certain Indian languages have no such word. All verbs of going must specify the manner of going, as to go-over-the-mountain, to go-to the river, to go-on horse-back, etc.—*i. e.*, early languages, for want of the power of abstraction on the part of the people possessing them, become *holophrastic*. Such people speak in phrases instead of words. This idea might be followed out much further.

After language, which is itself an art, we find man developing other arts, not merely the arts of decoration, already considered, but the arts of self-protection and self-preservation. These depend on inventive power, which, though wholly rational, is a power very early developed. Art of every kind is exclusively human. Man is the only creature who uses tools. The tools and weapons of all animals are a part of themselves, and are genetic products; those of man are part of their environment, and are mechanical products. Everything that pertains to culture is of this last class. Civilization is exclusively artificial and exclusively human. Art is essentially teleological—*i. e.*, it is a product of design—and there is no evidence that animals possess this faculty. Many of the lower creatures do indeed lay in stores for the future, but it is always the result of an instinct genetically developed as a condition to survival. Clustering round this idea of prevision there is a large class of phenomena which seem to be especially human. Besides purpose, intention, and provision, there are the states known as anticipation, ambition, and aspiration, which all grow out of the power to forecast the future. It is not believed that the lower creatures live in the future in any such sense. They have their wants, even yearnings, no doubt, and they have expectations, and perhaps hopes, but they have no anticipations in the sense of feeling the pain or pleasure of experiences that are not present. This is a representative power which is wholly intellectual. Men really both suffer and enjoy more in anticipation than in participation. Imagine the criminal condemned to death, or, to

take a simpler case, think how much of the pain of a surgical operation is due to the antecedent realization of what must be undergone. It is the same with enjoyments, not merely the simpler physical ones, but especially the remote mental ones, and the sacrifices of a long and laborious life are cheerfully made in anticipation of the foreseen results.

Self-consciousness is often referred to as a distinguishing characteristic of man. Many, however, fail to gain a clear conception of what this faculty is. Dr Carpenter confounds it with the "power of reflecting on their own mental states,"* while Mr Darwin associates it with abstraction and other of the derivative faculties. It is certainly something much simpler than introspection, and has an earlier origin than the highly derivative speculative faculties. If it could only be seized and clearly understood, self-consciousness would doubtless prove to be the primary and fundamental human attribute. Unlike reason, it has no roots in the animal stage; but neither do all men possess it. Our language seems to lack the proper word to express it in its simplest form. "Think" approaches this most nearly, and man is sometimes described as a "thinking being." The German language has a better word, viz., *besinnen*, and the substantive *Besonnenheit* seems to touch the kernel of the problem. Schopenhauer says: "The animal lives without any *Besonnenheit*. It has consciousness—i. e., it knows itself and its weal and woe; also the objects which produce these; but its knowledge remains constantly subjective, never becomes objective: everything that it embraces appears to exist in and of itself, and can therefore never become an object of representation nor a problem for meditation. Its consciousness is thus wholly immanent. The consciousness of the savage man is similarly constituted in that his perceptions of things and of the world remain preponderantly subjective and immanent. He perceives things in the world, but not the world; his own actions and passions, but not himself. As now, through infinite gradations the light of consciousness rises, *Besonnenheit* enters more and more into it, and thus it gradually comes about that occasionally, though rarely, and with very different degrees of clearness, the question flashes through his head, 'What does it all mean?' or, 'How has it been brought about?' The first question, when it attains

* Mental Physiology, p. 102.

great clearness and persistency, makes the philosopher; the second, the artist or poet; and thus the high calling of both these has its roots in the *Besonnenheit*, which first of all springs from the clearness with which they become conscious of the world, and are thereby led to the contemplation of it. But the whole process is due to the intellect gaining the ascendant and at times breaking loose from the will, whose servant it originally was."

This self-orientation or incipient reflection is thus seen to be something quite different from self-consciousness in the usual sense. It is not so much self as it is the outside world of which the intellect becomes conscious. It is not a subjective but an objective phenomenon, and in so far as self is concerned, it is objectively contemplated as part of the world. This early intellectual state is succeeded by those higher powers of introspection, speculation, reflection, abstraction, and generalization which characterize the developed mind of man, and all this is accompanied by the general differentiation of the faculties and refinement of the mental and moral organization of the race. Among the more important of these powers are those of creating new wants and of increasing the supply necessary to satisfy them. No animal accomplishes this. The animal's wants are adjusted by the slow process of adaptation to the sources of supply, and even when these wants are all supplied it is not probable that any higher ones arise. Not so with man. The moment the coarser and more essential physical wants are supplied he feels new ones, both physical and mental, arise, and he proceeds to supply these.

To what extent the fact of association has been a factor in producing this last fundamental difference between men and animals is one of the leading questions in sociology. For my own part, I am disposed to attribute it, directly or indirectly, almost wholly to this cause.

THE NAME CHICKAHOMINY, ITS ORIGIN AND ETYMOLOGY

BY WILLIAM WALLACE TOOKER

This well-known name acquired considerable celebrity in the days of the Rebellion for the reason that the geographical position of the river made it one of the natural bulwarks of defense for the capital of the Confederacy. Over two and a half centuries prior to this historic epoch it constituted one of the barriers of Wahunsonacock or Powhatan, when he immured himself and his treasures far up in the swampy wilderness at its source in order to escape the close proximity of the Jamestown people.*

It is not, however, the strife and turmoil of war, neither is it the jealous vagaries of Powhatan, that is now the theme of our story, but of an earlier period, in the very dawn of its annals—a point of time in the calendar of the past from which in reality we may date the genesis of our country. Inasmuch as Professor Edward Arber has justly observed, there can be no doubt whatever had Captain John Smith and his companions failed to have survived the winter of 1607-'8 it would have delayed all settlement from English sources for many years. Therefore the survival of the colony had a very marked bearing on the events which followed, and that led finally to the creation of this great commonwealth—the United States of America.

As the subject of my study, as applied to a people, is intimately concerned in having contributed more than their quota to these events, their story is more than worthy of being retold and analyzed—in fact, the name Chickahominy deserves to be enshrined in letters of gold on the pages of our colonial history; for we cannot find a counterpart where a tribe of Indians, in its consequent results, did more for an English settlement than the friendly natives whom Captain John Smith found dwelling on the stream now bearing their name.

The early recital of the Jamestown colony is a narrative of a

* Arber's Smith, p. 80.

struggle for existence—a struggle for their very lives, which we at this late day cannot realize, nor can we adequately appreciate it. The long and weary voyage of over five months' duration, in the most inclement of seasons, had its share in weakening the energy and ambition of the colonists, as it was also one of the main causes for the exhaustion of their food supply. The unhealthfulness of their chosen plantation soon showed itself, and in the very hot summer ensuing they dropped off one by one, until out of one hundred and five persons only fifty-nine remained when September arrived. This sickness, quarrels, and fear of the Indians had so unnerved the survivors that they were unable to plant or to properly provide themselves with food sufficient to last through the winter, which now confronted them. Their tents were decaying, and their temporary shelters were but poor substitutes for their English homes. Many of the colonists were gentlemen, totally unused to manual labor and to their new modes of living. Smith, however, was inured to hardships and to privation, and by his own example and unbounded personal resources induced them to build and to thatch their houses for the winter. Time was onward flying, all were on a limited allowance, having but fourteen days' food supply left. Lots were cast as to who should command a party to trade among the natives for the actual necessities of life. The chance fell to our heroic English captain, who unselfishly was ready and willing for any emergency.

After a trip to several places on the James river with almost barren results, on the 9th of November, 1607, he set forward for the "country of the Chikahamania."* That evening, while "staying the ebb" in the bay of Paspahigh, "at the mouth of the river," he was hailed by certain Indians, one of whom, being of "Chikahamania," offered to conduct him to their country. He started by moonlight, under guidance of this Indian, and at midnight arrived at the town. The next morning he began his bartering of copper and hatchets for corn, each family endeavoring to give him all he wanted. They caused him to stay so long that one hundred at least finally assembled expecting trade. What he desired he purchased; but in order that they should not perceive his great want, he went higher up the river. Smith remarks: "This place is called Manosquosick [= Wanasqua-

*Arber's Smith, p. 11.

es-ick, at or on the top of a hill], a quarter of a mile from the riuer, containing thirtie or fortie houses, vppon an exceeding high land: at the foote of the hill towards the riuer, is a plaine wood, watered with many springes, which fall twentie yardes right downe into the riuer. . . . A mile from thence is a Towne called Oraniocke. I further discovered the townes of Mansa, Apanaock, Werawahone, and Mamanahunt."

Smith was very kindly received at all of these villages, especially so at the last named, which was about the center of the habitations on the river, where he found assembled two hundred people, with such an abundance of corn that he might have loaded a ship; but he, having in his mind the great need of his associates remaining at their plantation, went back, where he arrived at midnight. The next morning he unloaded seven hogsheds of corn into their store. On November 13 he was back again at Mamanahunt, where the people, having heard of his visit, had gathered there with three or four hundred baskets, little and big, and soon he was enabled to load his barge again.

He says: "So desirous of trade wer(e) they, that they would follow me with their canowes; and for any thing, giue it me, rather then returne it back. So I vnloaded again 7 or 8. hogsheds at our fort."

Having thus provided a store amounting altogether to sixteen hogsheds, he, for the third time, went up the "riuer of the Chikahamanias." He discovered and visited eight or more towns; but he found their plenty of corn had decreased, although he was enabled to load the barge again.

Others beside Smith bear testimony as to his visits vp the river. Wingfield says: * "The 10th of December, Master Smyth went up the Ryuer of the Chechohomynies to trade for corne." This was Smith's last voyage that season, on which occasion he was taken prisoner by neighboring tribes for being too adventurous, although the attempt was urged upon him by the colonists.† It will be observed from Wingfield's statement that he was aware that the appellation properly belonged to the people and not to the stream.

Thomas Studley ‡ says: § "But in the interim, he made 3 or 4. iournies, and discovered the people of Chickahamine. Yet what

* Arber's Smith, p. lxxxv.

† Arber's Smith, p. 98.

‡ Arber's Smith, pp. 86, 411.

§ Ibid., p. 97.

he carefully provided, the rest careles(s)ly spent. . . . The Spanyard never more greedily desired gold then he victuall: which he found so plentiful in the riuer of Chickahamine, where hundreds of Salvages, in diuers places, stood with baskets expecting his coming."

This extract is taken from the second part of John Smith's map of Virginia, with a description of the colony, etc., which was the condensed vindication or manifesto of thirty or forty gentlemen and soldiers who, under Smith, saved the colony.

In this portion of Smith's works I find the terminal dropped, and the name there given as Chickahamine or Chickahamina, which affords strong evidence in favor of the etymology that I shall present.

The highest inhabited town on the river was called Apocant, at the edge of the swampy wilderness, only forty miles from its junction with the James; consequently all of these towns that contributed so willingly to the necessities of the colony, and undoubtedly saved them from the horrors of starvation, were situated within a short distance of each other. The peaceful and unwarlike character of the tribe is accounted for by several facts. First, that they were under a different form of government from their neighbors, and had no war chief; second, that they were industrious agriculturists and a sedentary people at the time of Smith's visits; third, that the isolated position of the river, totally unnavigable, even by canoes, from the west, surrounded by almost impenetrable and uninhabited thickets, made their homes a place secluded and safe from the more nomadic and warlike tribes of the north and west.

In my essay on the name *Susquehanna** I gave an analysis of its earliest form, *Sasqu-esah-anough* (= people who break into small pieces; hence by connotation "people of booty"), corroborated by historical facts and paralleled in several dialects of the Algonquian language. After further extended research and study, I am still more firmly convinced that this derivation is the true one; and that its demonstration can be much further augmented and proven, I quote it again, at this time and place, because I believe its terminal *-anough* and verb *-esah* enter into the composition of our present study.

In searching Smith's works I find that Chechohomynies,

**American Antiquarian*, vol. 15, p. 286.

Checka Hamania, Chikahamania, Chickahammania, Chickahaminos, and the form before mentioned are among the most marked of its variations. The name, as well as the greater number of those terms applied to the principal Virginia tribes, belongs to the class formed from verbs, as participials or verbal nouns, denoting according to its terminal a place where or a people by whom the action of the verb was performed. In the proper interpretation of such cluster words we must find a clue, either historical or traditional, which will assist in unlocking its synthesis. The key was discovered in the case of my studies of the "Kuskarawaokes of Captain John Smith,"* "The Algonquian Terms Patawomeke and Massawomeke,"† "On the Meaning of the Name Anacostia,"‡ and it has been found in the foregoing relation left us by Captain John Smith and his associates, as will be observed later.

In our modern form of Chickahominy we have the original sounds, as indicated by its early variations, of *Chick-ahäm-min'-anough*. The special affix or verb *-ahäm* implies "he beats or batters" the object *min'*, after the manner of the root-word or prefix *chick*, and it is the Powhatan equivalent of the Massachusetts *-etaham*; Delaware, *-iteh'm*; Cree, *-tahu'm*; Narragansett, *-utahum*, "he beats." This verbal affix is the inanimate third person singular in all these dialects,§ and is in common use in all four, as well as in other dialects of the same linguistic stock. The verb, however, becomes animate in such words as the Massachusetts *m'etah*; Cree, *m'itch*, "the heart," *i. e.*, "the beater;" Narragansett, *w'uttah*, "heart," *i. e.*, "he beats." The prefix *chick* or *k'chick*, "it is large, great," *i. e.*, "coarse, in distinction to fine," implies, with its verb *-ahäm*, "he beats coarse," *i. e.*, "coarse-pounded." The object *min* or *mün* denotes any kind of small berry, fruit, or grain,|| but when used in compound words without a special prefix refers to corn. The terminal in *-ias*, *-anias*, or *-os* I regard as a softened or abbreviated sound of the generic *-anough*, "nation or people," with the mark of the English possessive added. Thus we have a synthesis of *K'chick-ahäm-min'-anough*, "coarse-pounded corn people," or, as it might be rendered

* American Anthropologist, vol. vi, p. 400.

† Ibid., vol. vii, p. 174.

‡ Ibid., vol. vii, p. 349.

§ Howse Grammar of the Cree, p. 87.

|| Lenapé and Their Legends, p. 48, Brinton.

by a free translation, "hominy people." The term was probably applied to them by neighboring tribes for the reason that it was one of their products of trade, or, as was more probable, their principal article of sustenance, as it remains today among certain classes in the Sunny South.

Some analogous terms are *Schéechgänim'*,* "shelled corn coarse-pounded." [Chaff? Zeisberger.] This word is identical in meaning with our *k'chick-ahäm-min'*, *sché* being an explosive sound and a variation of *k'che* or *k'chick-echgän*, being another verbal signifying to beat [with a hand instrument]. *-im'* a contraction for *min'*, corn. Powhatan (Strachey), *rokohamin* = *rok-ohäm-min*, "parched corn ground small." Allowing for the alternating sounds of its initial, *rok* is undoubtedly the same verbal noun as the Narragansett *nókehick*, "parched meal," *nokhik* (Eliot), "meal," "flour," "ground corn." Wood says: † "Nocake (as they call it), which is nothing but Indian corn parched in the hot ashes, . . . beaten to powder." *Ushuc-cohomen*, "to beat corn into a meal;" *usketehamü*, "meal made of gynny wheat." Strachey here gives us two distinct forms of the same verbal in words having the same meaning, for "gynny wheat" was another name for maize.‡ The verb in the first *-ohom* has the Powhatan characteristics, while the latter *-eteham* resembles the Massachusetts and Delaware forms. The reason for this is probably found in the fact that *usketehamü*, "fine-beaten corn," belongs to a dialect other than the Powhatan. Compare the Narragansett *tackhummin*, "to grind corn;" *tackhumminnea*, "beat me parched meal." From these cluster words, including that of our subject, is derived our common name "hominy," of which it is a contraction for ease of utterance among the English. Here I differ somewhat from Dr J. Hammond Trumbull, with good reasons, for the name "hominy" was given to the grain dried and pounded.

He says: § "Hominey is a form of *minne* with an emphasizing aspirate *-h'minne*, to denote the grain par excellence—i. e., maize; but in Virginia and New England this name was restricted by the English to one, and the most common prepara-

* Lenapé Dict., Brinton.

† N. E. Prospect, p. 2, chap. 6, p. 76.

‡ Harlot's Narr., p. 21, Quaritch Ed.

§ On some Words derived from Language of the North American Indians, p. 6.

tion of maize. In Norwood's "Voyage to Virginia, 1649, 'homini' is described as the corn of that country beat and boiled to mush." Josselyn in "New England Rarities," page 53, says that "after the first flour had been sifted from the pounded corn the remainder they call 'homminy,' which they boil upon a gentle fire till it be like a hasty pudden." Consequently, as will be observed, the *h* is not an emphasizing aspirate except as it is so much of the Algonquian verb "to beat," as erroneously used by the English.

Rev. John Heckewelder, in his "Names which the Lenni Lennape or Delaware Indians gave to rivers, streams, and localities within the States of Pennsylvania, New York, Maryland, and Virginia," presents a translation of the name which has been and is still frequently quoted, viz., "Chickahominy, corrupted from Tschikenemahoni, signifying 'a turkey-lick, a lick frequented by turkeys.'" It does not require much argument to show that such a derivation is entirely out of place, as applied to these people, and that this suggested etymology is entirely contrary to its early forms, therefore unworthy of further examination or reiteration.

Again, some one has suggested that Chickahominy denoted "great corn," which Dr Trumbull* says "does not stand for 'great corn,' because 'corn' does not designate place or imply a fixed location, therefore cannot be made the ground-word of a place name." Dr Trumbull is undoubtedly correct in this statement so far as a "place name" is concerned, but he was evidently unaware that "Chickahominy, as I have demonstrated, was not originally 'a place name,' although it became one by its bestowal on the river by the English, without consideration for its true meaning." In proof of this fact, the tribe offered to relinquish the appellation of "Chickahomania and to be called Tassantessus [= strangers], as they call us."† Therefore the analysis which I have presented, although it does not exactly stand for "great corn," is in accordance with Algonquian grammar, and, as I firmly believe, beyond question, its true etymology.

* Indian Geographical Names, p. 49.

† Arber's Smith, p. 515.

A YUMA CREMATION

BY G. R. PUTNAM

Opposite Yuma, Arizona, on the California side of the Colorado river, lies the reservation of the Yuma Indians, and here, scattered through the bottom lands, live some three thousand of the tribe. They are a comparatively harmless people, few finding their way into the territorial penitentiary at Yuma. At San Quentin, in California, however, there are several of the tribe who got themselves into trouble by carrying out an old traditional privilege—the right of the relatives of a person who has died to kill the medicine man in case the deceased is the third patient lost. Another and rather more rational custom they have is that of burning the dead, and the following notes are written to describe one of these rites witnessed by the writer in March, 1892, while engaged in work for the United States Coast and Geodetic Survey.

Antonio (for most of these Indians are known by English or Spanish in addition to their native names), a well-formed young man of about twenty-seven, had been suddenly taken sick early in the morning while at work in the town, and by 11 o'clock was dead, despite the efforts of the medicine man. Although the Indians now usually resort to an American physician, in this instance the doctor was not called until all was over, when he pronounced it a case of apoplexy. The body was carried across the river to the meeting-house of the tribe, an open structure composed simply of a roof of cut boughs supported by symmetrically placed poles, the sides being entirely open, save a small room at the back. This house stood a few rods behind that of McGill, the chief of the tribe. The latter was a more pretentious structure than the ordinary Indian hut, being built of rough lumber, with low flat roof, but with no floor and few openings and looking much like a large dry-goods box.

The body, rolled in a blanket, was laid on the ground near the front of this open lodge, and the Indians, who had gathered from far and near, grouped themselves about. Close to the corpse stood the old men and women, usually very slovenly dressed and often

with hideous faces. On these seemed to fall the principal burden of lamentation, and for hour after hour they kept up a succession of unearthly groans and wails, interspersed sometimes by remarks about the deceased made by the men in a loud tone. Only in a few instances were real tears seen. On the right stood a few of the young men, a class not well represented, however. Among these were to be seen some handsome faces. Their dress was a pair of blue overalls and a white undershirt, without hat or shoes. They never wear anything on the head, depending entirely on their luxurious growth of jet black hair for protection from the fierce sun of Yuma. This is their chief ornament and their greatest pride. It is allowed to fall over the shoulders, and is then cut off straight across the back. It hangs behind in cords formed by rolling when wet. In front it partly covers the face, a characteristic motion being a jerk of the head to throw it back from the face. Their faces were usually clean shaven, and sometimes ornamented with streaks or blotches of paint, or with ornaments in the nose. The young men were generally silent at this ceremony, as were also the young squaws, who were seated on the left of the group. These were dressed in red or blue calico prints, and wore their hair much as the men, save that it was less carefully kept, and was cut straight across the forehead similar to the modern bang.

Early in the afternoon the chief selected a half dozen strong men, and with axes on their shoulders they went to the woods to cut the timber for the funeral pile. This was erected a few rods south of the lodge. A shallow square hole was first dug in the sandy soil. On each side of this was driven an upright stake, standing some three feet above the ground, and at one end a half dozen stakes. Across the hole and between the two side stakes were then laid a number of heavy green willow logs, about eight feet in length, the logs being piled higher on each side so as to leave a trough in the middle to receive the remains. At one side was another pile of logs, which were to form the covering when the body had been placed in position. The upright stakes at the head were intended to support these logs at one end, so that their weight would not rest on the head of the corpse. Around the whole evenly cut brush was placed, standing on end. Everything was arranged neatly but simply.

Without the slightest intermission the wailing in the lodge

continued throughout the afternoon and on into the night. As evening came on the scorching heat of the day was succeeded by a temperature so much cooler that many little bonfires were kindled here and there in the neighborhood, and those Indians who were not taking active part in the ceremonies gathered about in picturesque groups; others wrapped their blankets about them and lay down to sleep, with perhaps a log or a tin can for a pillow. The relatives of the dead man lived at Algodona, about twelve miles down the river, and the ceremonies were not proceeded with until the messengers had returned with them. When all had arrived the medicine man took charge of the remains. A space was cleared about the body, and the lamentations became more subdued. For nearly two hours the medicine man went through various rites. He inhaled the smoke of a cigarette and blew it into the mouth, eyes, nose, and ears of the corpse, and occasionally blew it up toward the stars. He rubbed and pressed the body and now and then straddled grotesquely up and down over it. He finally sang with a clear voice a rude incantation, a repetition of a few short sentences. As his efforts ceased, one of those from Algodona began to speak and continued for many minutes in a calm, dignified, and most pleasing tone. He was followed by McGill, the chief of the Yumas, who spoke in much the same style, though not such a gifted orator. McGill was dressed much as his fellow Indians, save that he carried a cane and wore shoes and a ribbon in his hair. He was a fine-looking man, with a kindly and intelligent face.

As these ceremonies ceased the circle again closed about the body, and the lamentations, which had continued through all, again increased in volume. Nothing more was to be done until the moon rose, about 2 o'clock in the morning. Many again stretched themselves on the ground, and as the hours passed away the scene gradually assumed a quieter aspect. But over the mesa in the east a faint light appeared; gradually the sky was illumined, and the beautiful moon arose, throwing its light over the turbid yellow torrent of the Colorado. When it had mounted half an hour into the sky the scene suddenly became more animated, the wails and moans were redoubled, all were on their feet, and four strong men took up the body, bearing it by the blanket in which it was rolled, and carried it to the

funeral pile. Here it was carefully placed in the center of the logs and a blanket spread over it, and then the heavy logs were piled above, supported on the upright stakes, so as not to touch the head, but resting on the feet. The chief stood at one side and directed all. When completed, the pile was about four feet high, four feet wide, and eight feet long, containing therefore about a cord of wood.

On top were placed the possessions of the dead man—in this case but a single blanket, for he was poor. If he had owned a house that would have been burned also. A fagot was brought and applied to the dry brush in many places, and in an instant all was ablaze. As the heat increased the circle gradually widened until there was a great ring of Indians about thirty feet from the burning pile, as near as the heat could be endured. Various articles of clothing were thrown on the pile, some being removed on the spot and others brought for the purpose. This clothing the spirit was supposed to take to the other world, where it will be claimed by the original owner on his death. Those who spoke earlier in the evening now spoke again for an hour or more, uttering detached sentences with long pauses between. The groans and wails continued, and some of the old squaws and men went around the circle, laying their hands on the shoulders or heads of others. Some of the squaws had been wailing continuously for fifteen hours (since the preceding noon), and as a consequence their voices were almost entirely gone, and their efforts to use them now were almost ludicrous. A most weird and impressive scene was this, the flames leaping high in the air and lighting the dusky faces of the great circle of Yumas, seated or standing, some now with rather scanty attire, the unearthly wails and the solemn words of the chief, with the moon looking down on all. As the pile slowly crumbled the sounds ceased and many silently moved away in the early dawn.

The next day there was nothing, save a few mesquite beans scattered over the surface, to show where this remarkable ceremony had taken place. The ashes had been carefully gathered into the hole below and the ground smoothed over.

AUSTRALIAN ROCK PICTURES

BY R. H. MATHEWS

Aboriginal drawings, more or less artistic, have been observed throughout Australia, but until recently no systematic attempt has been made to copy and describe them in detail and to fix their position on public maps.

In the *Journal of the Royal Society of New South Wales*, volume XXVIII, now in press, I have described and illustrated a number of rock carvings and paintings in New South Wales, and have also contributed an article on the same subject to the *Royal Society of Victoria*, which appears in their "Proceedings," volume VII, N. S., with illustrations and descriptions.

I have described the paintings contained in three caves, all of which are of an interesting character, containing a variety of figures, including men, women, animals, birds, fish, and other objects. Figures 1 and 3, plate I, are exact reproductions of the pictures on the rock, in their correct relative positions. In figure 2, as stated in the description, the different paintings have been placed close together, regardless of their position on the cave wall. All the objects shown are in black, the predominating color in native drawings, but they are also frequently found in large numbers in red and in white. In a few instances I have seen small objects, such as hands, drawn in yellow. For an average specimen of the different kinds of drawing, and the colors used, see plate VIII of the "Proceedings of the Royal Society of Victoria," volume VII, N. S.

Plate II shows 36 figures, all of which are described separately in the letter-press. Figures 1, 2, and 3 represent groups of several objects exactly as they appear on the surface of the rock. Figures 4 to 36 are placed on the sheet in such manner as to take up no more space than is necessary to exhibit them clearly, without regard to their relative positions.

All the paintings and carvings treated of in this paper are original, with one exception, and I have drawn attention to that

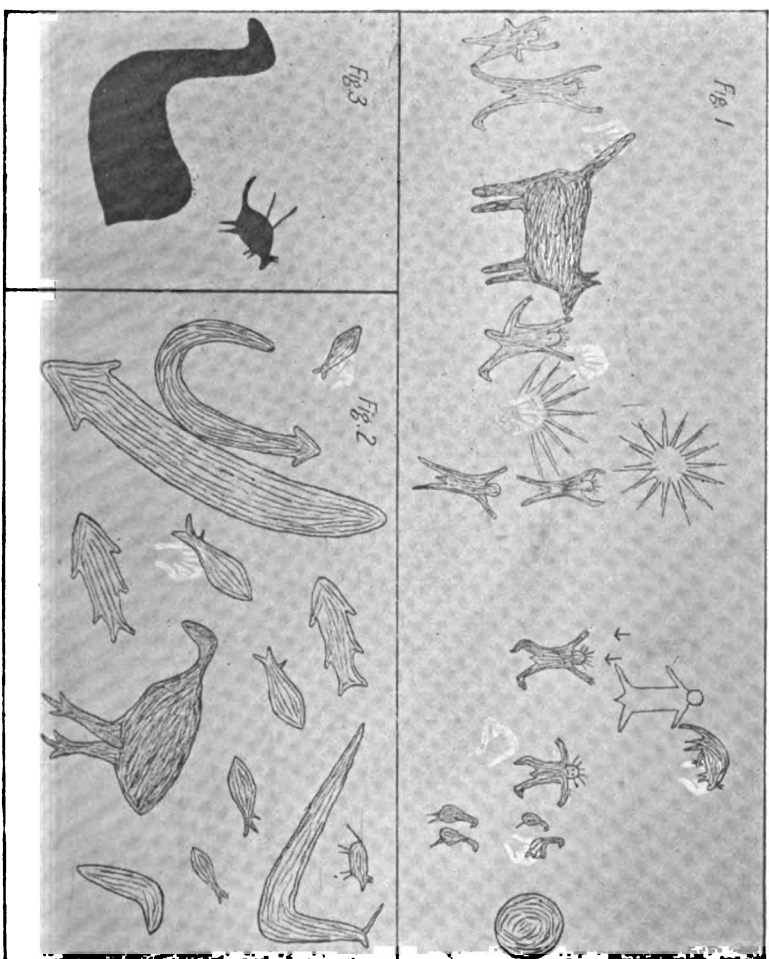


PLATE I.—Rock paintings in New South Wales

(Scale, about 3½ inches = 1 foot)

exception in my description of it. The figures are drawn to scale from careful measurements and sketches taken by myself, and the position of each on the Government maps is also stated in the descriptions, so that they can be readily found.

Rock paintings are met with in all the Australian colonies, but rock carvings on an extensive scale have been seen only in New South Wales and West Australia.* Regarding the latter, I will quote from Captain Wickham's "Notes on Depuch Island," published in the *Journal of the Royal Geographical Society*, London, 1842, vol. xii, pp. 79-83: .

Depuch island, latitude $20^{\circ} 38' S.$, longitude $117^{\circ} 44' E.$, is one of a string of small islands called the Forrestier group, lying from one to three miles off the coast of West Australia. The island is connected with the main land by ridges of sand, which in many places become quite dry at low water and afford facilities to the natives for reaching the island for the purpose of procuring turtle, as well as for the exercise of their talent for drawing on the smooth surface of the rocks.

From the vast numbers of specimens of art, the natives seemed to have amused themselves in this way from time immemorial; and from the very hard nature of the stone and the accuracy with which many animals and birds are represented, they deserve great credit for patient perseverance and for more talent and observation than is usually bestowed on the natives of New Holland.

The method pursued in tracing the different objects appears to be by cutting the surface of the rock with sharp-pointed pieces of the same stone; and as the exterior of all parts of it is of a dark reddish brown color, the contrast becomes great when that is removed and the natural color of the greenstone is exposed. It is difficult to conjecture what many of their drawings are intended to represent, but others are too well done to admit of a moment's doubt. Probably many of the inferior performances were the work of the children. In some of the drawings the surface of the stone was entirely cut away; others were only in outline.

Captain Wickham forwarded to the Royal Geographical Society at London ninety-two specimens of these carvings, describing the various objects represented. Many of these are illustrated in the journal mentioned. Captain J. L. Stokes, in his "Discoveries in Australia," published in 1846, volume II, pages 168-172, also mentions these carvings, but his description is not so full and exact as that of Captain Wickham.

* Some simple marks or scratchings have been observed on rocks in a few places in South Australia and Queensland, but nothing of this kind has, so far as I know, been seen in Victoria. In the latter colony, however, I know of some paintings in caves in the counties of Dundas and Borung.

As a remarkable instance of the small amount of inquiry hitherto bestowed on Australian rock pictures, I may point out that these carvings have been referred to as paintings. In Smyth's "Aborigines of Victoria," volume I, page 292, he says: "On Depuch island Stokes found a large number of paintings." The Rev. J. Mathew, in the "Journal of the Anthropological Institute of Great Britain," volume XXIII, page 42, speaks of "the paintings on Depuch island." I hope that this mistake will not again be made when referring to these native drawings.

In the papers which I contributed to the Royal Societies of Victoria and New South Wales, respectively, I have fully detailed the way in which paintings and carvings were executed by the native artists, the different styles of drawing, their geographic range, etc., so that it is unnecessary for me to treat of these parts of the subject in the following pages.

For the sake of clearness, aboriginal rock pictures should be described under two heads—paintings and carvings. In the former the pictures are painted on the walls and roofs of caves or rock shelters in various colors. In the latter the drawings are in the nature of outline engravings or carvings cut or ground into the surface of the rock. In my previous papers I have separated the subject under the two heads indicated, and will continue this distinction in the present memoir.

I will now describe the plates illustrating my original work, and hope that the information which I have collected may prove of some interest and value.

Description of the Plates.

PLATE I—PAINTINGS.

Figure 1.—The cave or rock shelter in which these drawings appear is 29 feet long, 8 feet 6 inches from the front inward to the back wall, and averages about 8 feet high. The floor is sandy soil, and there are traces of smoke on the roof, showing that the cave has occasionally been used as a camping place by the natives. It faces the east.

As the spectator stands facing the paintings on the back wall of the cave, the first figures on his left are those of a man and a woman, the former 25 inches, the latter 17 inches in height. Next is an animal which appears to be intended for a dog, al-

though much larger than the human figures alongside of it. I have often observed this want of uniformity of scale in native drawings. Scattered along the back wall of the cave are six more rude delineations of men, all of which are in the attitude usually assumed by the natives when dancing the corroboree. A few feet in front of the dog are two objects which may have been intended to represent the sun. The upper one, averaging a little over two feet in diameter, has fourteen rays. The other one, which is not complete, has nine rays. Near the right-hand upper corner is a female kangaroo, 16 inches long, from the pouch of which a young one is in the act of jumping. This is an interesting drawing, and I have seen it in but one other instance. There are also four paintings of birds, apparently of the cursorial tribe, and two tracks of bird feet. The last object on the right is 16 inches in diameter, and may have been intended to represent the moon. All the above drawings are in black outline, and all are shaded within their margins with the same color, with the exception of one of the human figures and what I have supposed to be a representation of the sun. Interspersed among the other figures, and in some instances partially covered by them, are seven human hands, done in white in the "stencil method" of drawing.* The only right hand amongst these is shown in the shut position, which is rather uncommon.

The escarpment of Hawkesbury sandstone in which this shelter is situated is about four or five chains west from Harris creek and about a mile and a half northerly from portion No. 17, of 40 acres, in the parish of Eckersley, county of Cumberland.

Figure 2.—This cave is a few yards northerly from the one last described, in a continuation of the same escarpment, and faces the same direction. It is 25 feet long and the average depth inward is about 8 feet. The back wall leans forward at an angle of about 30° from the perpendicular, and the height at the entrance is about 8 feet. Owing to the irregular way the figures are scattered over the wall, I have departed from my usual custom of showing them in their relative positions and have fitted them on the plate regardless of their position on the rock.

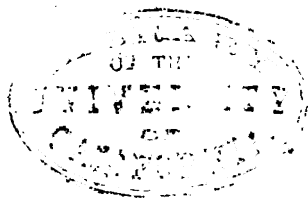
* For descriptions of the different methods of native painting and illustrative specimens, see *Proc. Roy. Soc. Vic.*, vii, n. s., pp. 144-6, plate viii.

The most interesting object in this figure is an emu 3 feet 9 inches long from the point of the bill to the end of the tail. The neck is too short and the legs too thick near the feet, but I feel certain the picture was drawn to represent the emu. There is a large eel 7 feet 2 inches long and 12 inches wide, with a smaller one in a bent position beside it. There are two fish with four fins, three with one fin, and two without fins. The large snake-like animal in the upper right-hand corner of the figure and the object near the tail of the emu I cannot further describe. There is a small quadruped which appears to belong to the rat or bandicoot tribe. Under two of the small fish, and produced previously to them, are two left hands stencilled in white. All the other figures are outlined in black and shaded with the same color within their margins. In this cave, as well as in that represented in figure 1, there are several other drawings, almost obliterated and too indistinct to be copied with certainty.

Figure 3.—The large cave containing these paintings is at the base of a precipitous escarpment of Hawkesbury sandstone about five chains easterly from the right bank of Georges river, within portion No. 1, of 640 acres, in the parish of Eckersley, county of Cumberland, and about 55 chains southeasterly from the north-west corner of that portion. Its length is 78 feet, depth from the front inward 20 feet, and its height about 30 feet. The roof is stained with smoke, and the shelter appears to have been used by the aborigines as a camping place for a considerable period. Fish were plentiful in Georges river, close by, and there were good hunting grounds all around.

The cave faces S. 70° W., and therefore the sun does not shine into it very much in winter; consequently the disintegration of the sandstone is more rapid than it would be in a dryer situation. Here and there throughout a considerable extent of the back wall traces of the former existence of paintings are discernible; but those shown on the plate are the only ones which can now be copied with any degree of certainty, and even these are becoming faint, owing to the natural decay of the rock.

An emu 4 feet 10 inches from the point of the bill to the tail, apparently sitting on its nest, is shown in solid black. There is a cavity in the rock just under the bird's breast which I think was there at the time the figure was drawn. About a foot above



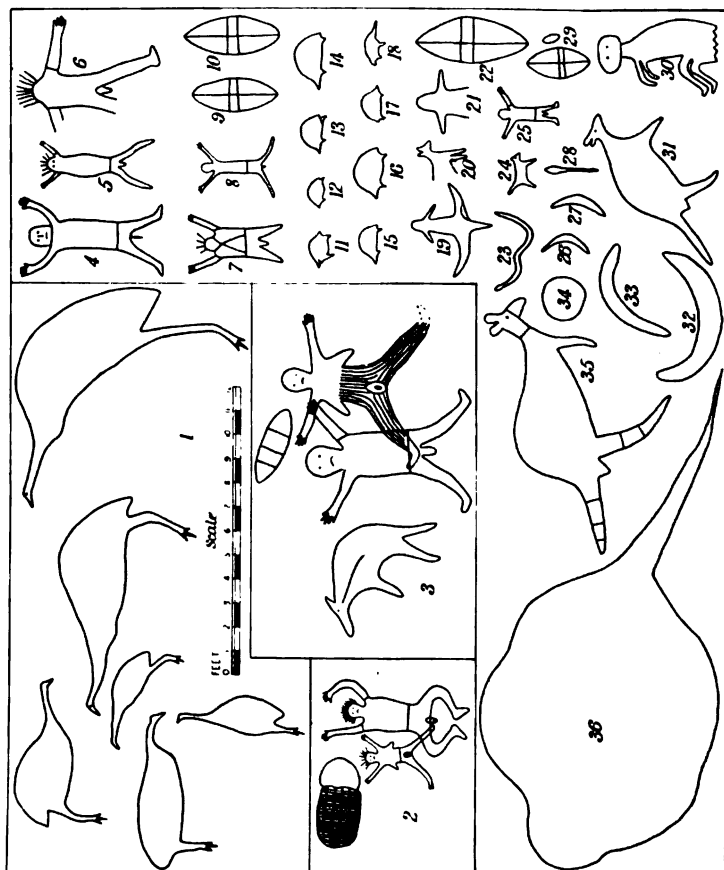


PLATE II—Rock carvings in New South Wales

the tail of the emu is a kangaroo, likewise in black, its whole length being 1 foot 9 inches, and having what appear to be intended for two spears sticking into its back. The same want of proportion in the relative sizes of these animals is observable as in the painting of the dog in figure 1.

PLATE II—CARVINGS.

Figure 1.—The group of six emus here shown appears to be intended for the cock and hen and four young birds. The cock, which is the largest figure of an emu which I have yet seen, is 10 feet 6 inches from the point of the bill to the end of the tail and 11 feet 3 inches from the bill to the end of the foot. What I have supposed to be the hen, or mother of the brood, measures 9 feet 3 inches from the bill to the tail. Similar measurement of the smallest bird of the group is 4 feet 3 inches. This figure is an exact reproduction of the group of birds as they appear on the rock. In all the native carvings of emus which I have yet seen only one leg is delineated, and the foot is a straight continuation of the leg. In paintings of this bird I have seen the two legs shown, but the foot has been depicted in the same way as in the carvings. See the emu in plate I, figure 2.

This group is carved* on a large flat rock of Hawkesbury sandstone, about two acres in extent, elevated only a few feet above the level of the surrounding land, in the parish of Spencer, county of Northumberland. It is situated on a bridle track (or trail) leading from Mangrove creek to Hawkesbury river, on the top of the range dividing the waters of these two streams.

Figure 2.—This group of carvings is situated on a flat sandstone rock, slightly elevated above the surface of the ground, on the western side of the road from Pymble to Cowan creek, a tributary of Hawkesbury river, about half a mile southerly from Bobbin trigonometrical station, in the parish of Gordon, county of Cumberland.

The carving represents a man and woman in the attitude assumed by the natives in performing a corroboree or native dance. The eyes and mouth are delineated, but the nose is missing in both. Each has a belt round the waist, and the man has a band

*For explanation of how carvings are executed, see *Proc. Roy. Soc. Vic.*, VII, N. 8, pp. 146-8.

round each arm near the shoulder. The male figure is very much the larger of the two, a disparity often found, but not universal, in native drawings. Seventeen ray-like lines rise from the head of the man and eight from the head of the woman, which may be intended either for hair or for ornaments stuck in it—probably the latter. There is a carving evidently intended to represent a native “dilly” bag, but the usual disregard of proportion between it and the human figures is observable. Close to the woman’s right hand is an object which may have been intended either for another bag or for a human foot-mark. There are three or four representations of human foot-marks above and close to this group which I have not included. They are about 1 foot 2 inches long by 6 or 7 inches wide, the distance between the strides varying from 4 feet 2 inches to 5 feet 9 inches. I have observed representations of human foot-marks among other carvings and also in native paintings.

I have reproduced this group and the description from my paper published in the “Proceedings of the Royal Society of Victoria,” volume VII, N. S., pages 152, 153, and plate IX, figure 8, for the purpose of enabling a comparison with other native drawings.

Figure 3.—The group here delineated is situated on the road from French’s forest to Pitt Water road, joining the latter at portion No. 64, of 640 acres, in the parish of Narrabeen, county of Cumberland. The carvings are on a flat rock on the eastern side of the road, a short distance southerly from the southern boundary line of the portion referred to, which line also forms the boundary between the parishes of Narrabeen and Manly Cove, the carvings being, therefore, just within the latter parish.

The central figure represents a man who, if the legs were straight, would measure about 7 feet 6 inches. He wears a belt, and there is a band round the left arm at the shoulder. Part of the right arm and hand, as well as the fingers of the left hand, are barely distinguishable. Beside him is the figure of a woman, about the same height, whose body is marked by a number of stripes extending from the breast to the feet, the left foot being rather indistinct. The mammæ are delineated in the way usually observed in native drawings. The eyes and mouth are shown in both figures. Above the heads of the man and woman is the representation of a shield 2 feet 4 inches long and a foot

wide in the middle, with three transverse bars cut upon it. On the right of the man is an animal somewhat resembling the kangaroo, but it may have been intended for a dog. It measures 5 feet 10 inches from the end of the tail to the nose. There is a line marked on the body of this animal, extending from the neck about 2 feet 6 inches towards the tail.

The man and woman are in the attitude of dancing, and the lines on the body of the latter may be intended to represent the stripes painted on the bodies of the natives on these occasions. This group, taken in connection with figure 2, is very interesting, as showing some of the positions assumed by the dancers. R. Sadleir, in his "Aborigines of Australia," page 19, says: "There are many kinds of Corroborees. All have the song and the dance; both are at times very libidinous, especially the dance of the women. . . . Their bodies are striped in white, and their heads fancifully adorned."

The tabular mass of sandstone containing this group is on a level with the surface of the surrounding land, from which the water oozes in wet seasons and in time of rain and flows over the rock, thus keeping it very damp, causing it to disintegrate more rapidly than if kept dry. The erosion caused by the action of the water has partly obliterated some parts of the figures and made the whole group somewhat indistinct. It was very fortunate that I discovered it and rescued it from oblivion, because in a few more years it will be altogether indistinguishable.

Figure 4.—This carving of a man 5 feet 7 inches tall, with an abnormally long body and short legs, appears on the same rock as figure 1. The eyes and mouth are shown, and also the nose, which is rare in these native drawings. There is a necklace and a belt round the neck and waist, respectively, both of which form part of the native dress.

Figure 5.—A rude figure of a man 4 feet 7 inches tall is depicted on a flat rock about 5 or 6 chains northwesterly from figure 3. There is a band round both arms, a belt round the waist, six ornamental lines rising from the head, and the eyes, but no other features. The feet are not shown, the legs terminating like the left leg of the woman in figure 2.

Figure 6.—This is another rude figure of a man, 5 feet 4 inches tall, carved on a southerly continuation of the same rock as that

on which the last-described figure appears. There are nine lines, averaging about 10 inches long, radiating from the head and bands round each of the arms near the shoulder. Part of a leg and part of an arm on one side have been obliterated by the natural decay of the rock.

Figure 7.—This unique little figure of a man 3 feet 3 inches tall is delineated on a large flat rock about half a mile south-westerly from Jones trigonometrical station, parish of Manly Cove, county of Cumberland. The fingers are shown, but not the feet, and there are four lines radiating from the head. There are bands across the arms, a belt round the waist, and two bands reaching from the belt to the shoulders, but crossing each other somewhat like a pair of braces.

Figure 8.—Another rude human figure, with a very long body and having the legs spread almost at right angles to it. The eyes are shown and there is a belt round the waist. This carving is on the same rock as figure 1.

Figures 9, 10.—These are two shields, the dimensions of the smaller being 3 feet 7 inches long and 1 foot 5 inches wide, and those of the larger 4 feet long and 1 foot 7 inches wide. Each has a longitudinal and two transverse bars cut upon it.

Figures 11 to 17.—These seven small objects are probably intended for the *echidna*, or hedgehog, the length of the smallest being 1 foot 3 inches, and that of the largest 2 feet 5 inches. They are on the same rock as figure 5, and each is within a few yards of the next.

Figure 18.—This small animal, 1 foot 10 inches long, which is on the same rock as the last described, may be intended for the flying squirrel or opossum, or perhaps for some of the rat tribe.

Figure 19.—It is difficult to decide whether this strange carving is intended for a man or for the skin of a kangaroo, but I think the former is the more probable. I have seen somewhat similar grotesque native drawings in which other detail showed unmistakably that they were intended for human beings. This carving is in one of the small gullies at the head of Deadman creek, within portion No. 19, of 960 acres, in the parish of Eckersly, and is about two miles northerly from Woronora river.

Figure 20.—This is a fairly well executed fore part of a kangaroo or wallaby, and is on the same rock as the last described.

The remainder of the figure has been carried away by the natural wasting of the rock.

Figure 21.—This is another rude carving of a man, but all the lower part has disappeared, owing to the decay of the rock. It is on the same flat rock as the last two figures.

Figure 22.—This shield, 4 feet 9 inches long and 1 foot 9 inches wide, is carved on the same rock as figure 5. There are one longitudinal and two transverse lines upon it.

Figure 23.—Represents a snake 4 feet 11 inches long and 2½ inches across the body. It is on the same rock as figure 1.

Figure 24.—This small figure, which is only 18 inches long, may be intended for a dog or a native cat, and is on the same rock as the last described.

Figure 25.—This small figure of a man is on the same rock as the last two figures and is 2 feet 6 inches tall. He wears a belt and a band round one arm near the shoulder.

Figures 26, 27.—These represent the Australian boomerang. The former is on the same rock as figure 1; the latter is near figure 5.

Figure 28.—This represents the aboriginal weapon known as the nulla-nulla. It is 2 feet 4 inches long and 4 inches across the widest part. It is on the same rock as figure 1.

Figure 29.—Another shield, 2 feet 8 inches long and 16 inches wide, with a longitudinal and two transverse bars. Near it is a small oval object, 9 inches long by 4½ inches wide, which I am unable to identify. These are on the same rock as figure 5.

Figure 30.—This curious figure, which I assume to be intended to represent a black fellow sitting down on a log or a rock, with his cloak made of opossum skins wrapped around him, is carved on the same sandstone rock as figures 19 to 21. It is 4 feet 10 inches from the top of the head to the wavy line, which I have supposed to represent the folds of the lower end of the cloak.

The legs, with the bent knees and feet, are fairly well drawn, but the arms resemble those seen in native pictures of kangaroos, except that in the latter there is usually only one limb delineated. The head is oval and two eyes are shown, but no other features. This is the only figure of this description I have yet met, and is therefore unusually interesting. If it is not intended for a human figure it may have been drawn to represent some monster of the native artist's imagination, connected with some tribal legend.

Figure 31.—A kangaroo 7 feet 10 inches from the nose to the end of the tail is here depicted. Only one fore leg and one hind leg are shown, the usual mode adopted by the natives in drawing figures of kangaroos. It is carved on the same rock as figure 1.

Figures 32, 33.—Native drawings of boomerangs are generally shown about the natural size, but those under notice measure 5 feet 1 inch and 4 feet 4 inches, respectively, in a straight line from end to end, which induces me to think that possibly they were intended to represent the moon. This is only thrown out as a suggestion. It is quite common to find drawings of men, animals, and other objects very much exaggerated in size. These carvings occur on the same rock as figure 7.

Figure 34.—This circular carving, 1 foot 10 inches in diameter, is on the same rock as figure 1, and unless it is intended to represent the moon, I cannot offer any other explanation. I have occasionally found such circular objects carved on rocks, and also in caves. See figure 1, plate 1, of this paper; also "Proceedings of the Royal Society of Victoria," volume VII, N. S., plate viii, figures 2 and 5.

Figure 35.—The large representation of a kangaroo here given measures 11 feet 1 inch from the end of the tail to the tip of the nose, and both as to correctness of figure and in detail is a great advance on similar drawings of this animal. Lines or bands are shown on the nose, neck, hind leg, and tail. Both ears are delineated and the eye is not forgotten. The animal is in the attitude of running. This carving is on a large mass of Hawkesbury sandstone, trending north and south, on top of the dividing range between Macdonald river and Webb creek, about where the boundary line between the parishes of Macdonald and Wonga, county of Hunter, crosses that range.

Figure 36.—This rude representation of what appears to be intended for a sting ray is carved upon the same rock as figure 1. The length of the body proper is 12 feet 9 inches, but, including the tail, the total length of the fish is 22 feet 1 inch, and its greatest breadth 9 feet 9 inches. The weight of some of these fishes may be readily understood by quoting from Captain Cook, when he visited Botany bay, New South Wales, in 1770. "I observed several large sting rays and caught one weighing 336 pounds after his entrails were taken out."

SOME PRINCIPLES OF NOMENCLATURE

BY W J MCGEE

I

Many of our common family names, or surnames, such as Smith and Carpenter, Hunter and Weaver, stand for occupations; others suggest personal characteristics, such as White and Brown for complexion, Small and Long for stature, Good and Meek for disposition; still others suggest place or condition of residence, such as Seaman and Hillman, Warman and McGee (Mac Eagh, or Child of the Mist). Many other family names represent either surnames or prenames with diminutives added; and these derived names may either indicate paternity, like Smithson and McDonald, Johnson and Fitzgerald, or they may stand simply as undefined diminutives, such as Smithie, Wilcox, and Peterkin; and the diminutives may be either prefixed as in O'Neil and Aphorp, or suffixed as in Clarkson and Wilcox. Many of our family names are derived from other tongues in which similar meanings may be found; and in yet other cases meanings are not at first apparent, yet are ascertainable if traced backwards through successive generations to the days when language was less definite than now and when every man was a law unto himself in matters of orthography and pronunciation. Thus most family names are found to have meanings, but the meaning is seldom recognized, and would commonly convey a false impression if it were.

In like manner certain prenames stand for character or condition, like Peter (rock) and Theophilus (god-beloved), though in most cases the signification is doubtful or completely lost; but analogy with the later-developed surnames and inference from the known meaning of certain prenames, either in the English or other languages, alike indicate that all such names originally carried associated meanings, and were indeed applied to express personal characteristics or other ideas connected with

the individuals, just as is the case among those savages who have risen to the plane of applying names to persons and things.

Similarly a part of our geographic names, like Blue ridge, Long island, Rocky mountains, and Lake Superior, express ideas associated with the features to which they are applied; yet many of the names of our rivers, lakes, and mountains are of aboriginal derivation, and while they conveyed poetic or prosaic meanings to the Red Men, are meaningless to us. So, too, in the older countries many names of places were originally common nouns, as indicated by the modern meaning (*e. g.*, Norfolk and Cambridge), by the retention of articles (*e. g.*, Le Havre and La Haye—Havre and The Hague in English), or by more obscure relations brought to light through antiquarian research. Thus, inference from known cases and analogy with family nomenclature and with the proper names of primitive peoples all indicate that geographic designations originally conveyed associated meanings; and this conclusion is in no way weakened by the fact that in most cases the original meanings are lost.

Accordingly, examination of the proper names applied to persons and places in this and other countries during the last three or five centuries indicates (1) That proper names originally expressed ideas collateral to or associated with the person or place named; (2) That as time passed these collateral or associated meanings were lost; and (3) That concurrently with the loss of the original by-meanings there has grown up a system of applying and using proper names as simple designations of, or labels for, the persons and things named. This differentiation in nomenclature has been effected within a few generations, and was evidently not only unforeseen but strongly opposed at every step by the tendency to apply names of associated meaning to new-born persons and newly discovered places—a tendency commonly failing only when invading races accepted names current among the conquered peoples, which, being of strange tongues, carried no associated meaning.

These conclusions concerning the evolution of place names are in harmony with the evolution of language as expounded by Whitney, Sayce, Powell, Mallory, and other scientific linguists. In the beginning certain ideas were doubtless conveyed by signs, as they are in some measure among the lower animals; and as ideas multiplied, the signs, whether movements, gestures, or

postures, increased in number until the sign once standing for a group of ideas was differentiated into a group of signs, each more or less definitely expressing its own idea. So, too, it is certain that in the primitive vocal language words were few, and while each represented perhaps a fairly definite central idea, ill-differentiated by-meanings also clung about it; and that as time passed, new words were invented or evolved to express the associated meanings, and thus the original words gradually became definite. In like manner the primitive written language was pictographic and represented animals, plants, and other objects to which associated meanings clung; but as the mind of man expanded the pictographs were replaced by symbols or ideographs, which expressed ideas directly rather than by association; and still later the more or less fanciful ideographs were pruned and molded into purely arbitrary characters expressing ideas only by combination—the process throughout representing change from a multiplicity of meanings toward simplicity. The general process of evolution in language, vocal and written, continues today, and nearly all of its stages are recorded in contemporary history of different peoples as well as in classic writings. Thus, there is a stage in the development of definite language in which more or less obscure by-meanings cling to words, and this is the stage of mysticism or dialectics, or esoteric ideation, from which we are not yet completely emancipated; and there is another stage in which by-meanings are expressed through modification of primary terms by inflection and by combination of elements, this being the stage of grammatic differentiation from which only the English language is at all emancipated. It is to be observed, however, that the tendency of the times is toward the elimination of complexities of both sorts and toward the abandonment of the more complex languages; and this would appear to be a reason for the ascendancy of the simple, tangible, and definite tongue and writing of the Anglo-Saxon. Possibly the Anglo-Saxon blood is more potent than that of other races; but it is to be remembered that the Anglo-Saxon language is the simplest, the most perfectly and simply symbolic, that the world has ever seen, and that by means of it the Anglo-Saxon saves his vitality for conquest instead of wasting it under the Jüggernaut of a cumbrous mechanism for conveying thought. Accordingly, on tracing the evolution of language,

it appears that signs, words, and symbols followed the course of late pursued by proper names ; at first the expressions covered a multitude of meanings, but the by-meanings have gradually fallen away until the principal linguistic elements have come to stand for simple dissociated ideas.

II

The evolution of nomenclature has now reached a stage in which it is not only possible but needful to discriminate two classes of proper names : The first or primitive class includes those having collateral or associated meanings, and may be called connotative or *connotive* ; the second class embraces simple designations without collateral or associated meanings, and may be called denotative or *denotive*.

Placing these classes in the order of their development, it is found that the connotive names are ancient, the denotive names modern. During earlier centuries nearly all place-names, as well as most surnames and many prenames of people, were connotive, while today, and particularly in this country, most place-names and nearly all person-names are practically denotive ; for even when an etymologic or ethnologic or antiquarian meaning clings to a name this by-meaning conveys no impression to ordinary users of the term ; Mr Miller is a man, tall or short, rich or poor, merchant prince or county pauper, as may happen, but neither the owner nor the driver of a mill ; and Harpers Ferry is a village or town, large or small, refined or rude, but never a strumming musician or a ferry. The forefathers infused their own individuality and that of their neighbors into their proper names, and thus developed an anthropomorphic nomenclature ; but their busier descendants will have none of it.

Yet, while in general connotive names have given place to denotive names, there is a noteworthy exception to this tendency of the times. In the cities of two centuries ago the street names were given in commemoration of men, trees, birds, streams and the like, and bore no relation to each other, while the houses were designated by their owners or by fanciful names ; but in this century city houses have come to be designated by numbers and, particularly in this country, the streets receive names or other designations designed to indicate their relation. So the

modern city nomenclature is connotive rather than denotive. It is to be observed, however, that this development of denotive nomenclature is not a reversal to the primitive condition, since the by-meanings are not accidental but designed, not random but systemic, and adapted to a definite end. In brief, the general tendency in the evolution of place-names is in the direction of denotive designations for independent units, and in the direction of connotive designations for interdependent parts.

The extended and vigorous growth of systemic place-names and person-names during the last five centuries is a striking feature of our civilization and is worthy of careful consideration. Its cause would appear to be simple. As energy takes the path of least resistance, so the mind seeks to encompass its end with the minimum expenditure of energy ; and thus it happens that men refuse, albeit unconsciously, to employ a complex idea when a simple one will do, and eventually fall into the habit of not only expressing themselves, but even thinking, in the most economical ways. Now, the idea conveyed by a connotive name is complex, while the idea conveyed by the denotive name is simple ; the one is a more or less elaborate impression, the other a single definite mark ; the one a pictograph or hieroglyph, the other a simple arbitrary symbol. So, however strongly sentiment may cling to the complex connotive meaning, economy of energy leads gradually, through instinct rather than definite consciousness, to the simplification of the idea, until finally it is intuitively stored, used, and conveyed in its most economic form. Hence economy in thought and utterance would seem to be the key-note to the evolution of proper names. It is to be observed that the same cause will explain the growth of language in general from the associative to the dissociative forms ; for it is economy (including much more than the "laziness" of Sayce) that forms the key-note to linguistic evolution.

III

The function of science is three-fold : (1) to discover that which is ; (2) to ascertain that which was in terms of that which is now ; and (3) to find courses of action in that which is and that which was, and thus to determine what is to be. Accordingly, the astronomer first observes the positions of the cosmic

bodies, next compares these positions with those observed by his forefathers and thus obtains a measure of cosmic movement, and then determines eclipses and conjunctions and occultations for decades in the future, and all modern ships are guided by his predictions. In like manner the chemist first ascertains the properties of a substance in a given form, next examines it under other forms and compares its different forms, and is then able to formulate laws of chemic action and predict changes going on with changed conditions to the extent that modern industries and household economy are based on his predictions. To a less degree the same order is pursued in the biotic sciences, though vital phenomena are more complex, so that prediction is less certain; yet the breeding of stock represents observation, comparison of stages, and prevision, so that domesticated animals and fowls represent in some measure the outcome of biotic prediction. The anthropologist has to deal not only with the animal body, but with the still more elusive and complex mind, so that his methods and results are still less exact than those of the biologist; yet even the student of man and his institutions profits greatly by the scientific method so useful in the ancillary branches of knowledge.

Now, when the scientific method is applied to personal and geographic names, it is first found that some names have associated meanings and others not; next, on comparing the present with the past, it is found that the meanings associated with certain names are constantly disappearing, and with further study that the by-meanings disappear through an instinctive tendency toward economy of thought and expression; and accordingly it is easy to predict that denotive names must come to prevail over connotive names. The principles thus suggested must guide the application and use of personal and geographic names; they will not indeed be recognized by all individuals, many of whom will employ the primitive method of giving more or less complex connotive names; but in the end economy of thought and expression in the hundred or thousand will outweigh the whim of the one, and thus the work of the obstructionist will come to nought, however strongly it be guarded—the child loves to remember that two apples and two apples are four apples, but the busy adult soon comes to remember only that $2 + 2 = 4$. The principles indeed will govern nomenclature, whether they are

recognized or not, in the future as in the past; they represent a law of nature which it were folly to oppose.

On applying these principles to the subject of American geographic nomenclature, a significant fact appears: Many of our rivers and mountains and some of our cities and towns bear aboriginal names. Now, while these names bore a meaning to the Red Man, and while in some cases the ethnologist or antiquary is able to interpret them, they are meaningless to the vast majority of people. Thus they are typical denotive terms. Moreover, a characteristic of the American people is directness of method in thought and expression; and in this way denotive nomenclature has been stimulated more than in other countries. For both of these reasons our American geographic nomenclature is largely denotive and to only a limited extent connotive; and since the denotive form is the higher in the evolution of proper names, it follows that our geographic nomenclature is superior to that of any other nation. And for this nomenclature we are indebted to the Red Men, whose homes we have despoiled and whose lands we have confiscated, and sentiment argues the rearing of a monument to a passing race by retaining the original names wherever possible. Be it remembered, too, that the retention of such names is but the extension of that denotive nomenclature which makes for further weal by simplifying thought—for it is not enough to say that Americans seek denotive nomenclature because of our national directness of method; here as elsewhere in nature tendencies are cumulative, and mental directness is increased and progress gained by reason of the simpler nomenclature.

Many local applications of the principles of nomenclature might be made, and some of these are worth stating. The best names for hills, valleys, rivers, and towns are denotive, since these features are not related, and since therefore the independent designation is the most economical. But streets and avenues, squares and houses, are parts of a unit and stand in relations to other parts which it is commonly economical to express. It is for this reason that while older cities gave unrelated designations to streets and houses, modern cities apply connotive street names and connotive house numbers. This is particularly true in America, where national characteristics have so largely led to the conscious or unconscious development of economic

methods ; and it is especially noteworthy in the more modern cities. The simplest and thus the best application of the connotive method in street designation is found in numbering streets ; another application is found in lettering them, and the perfection of street designation along two different but related lines is found in Washington, where the streets are numbered one way and lettered the other, and in Salt Lake City, where the streets are numbered both ways. Less desirable applications of the connotive method are found in the designation of streets by names of related meaning, whose initials are arranged alphabetically, so as to indicate their position with respect to a starting point. An excellent example of this method is found in certain suburbs of Washington, where streets take the names of American cities—Albany, Boston, Cincinnati, etc. Similarly streets may be designated by the names of trees arranged alphabetically—Aspen, Beech, Chestnut, etc,—or by the names of rivers—Atchafalaya, Brandywine, Colorado, etc. It is to be remembered, however, that use of names of cities, trees, or rivers in this way represents a return toward the primitive connotive nomenclature, which has been tried in the crucible of time and found bad ; it is a reversal of normal development, a social atavism, and it is too much to hope that the arrangement will serve any other useful purpose than that of permitting repetition of the alphabet without danger of confusion. Another application of the connotive method by means of the alphabet is found in the use of names of celebrities arranged alphabetically ; but this method is not only bootless, except for permitting the use of the alphabet in a distinctive way, but is perhaps objectionable in that it tends to degrade honored names without commemorating individuals—for Washington market, Jefferson place, and Adams street are but labels, and not one in ten who use them is reminded thereby of the founders of the nation, and many there are who never know their meaning. Viewed in the light of the evolution of proper names, the system of numbering streets and houses is the best that can possibly be devised, and next in excellence is the system of lettering streets ; and any departure from these systems is a step backward.

NOTES AND NEWS

"THE EARLY NAVAJO AND APACHE."—The deductions presented by Mr F. W. Hodge in the present number of the "Anthropologist" ("The Early Navajo and Apache," July, 1895) seem to be somewhat hastily derived, either from the authorities he cites or from other sources of information which he has not cited.

Unfortunately I am so situated here that it will be impossible for me at this moment to quote from notes which have been left in Washington, but I may at least be permitted to express an opinion upon a subject with which in times past I endeavored to familiarize myself, reserving for a later date the duty of a more elaborate examination of Mr Hodge's arguments.

To make my remarks as succinct as possible, I take issue with Mr Hodge in his conclusion, that the Apache tribe is of comparatively recent entrance into our southwest territory (*i. e.*, Arizona and New Mexico), a conclusion based upon the fact that one or two of the earlier Spanish writers, whom he names, do not specifically allude to the Apaches or to having encountered opposition from any hostile tribes during their progress northward.

Mr Hodge is honest in his methods and fair in his application of the material at his disposition, and he also frankly quotes the contrary convictions of Surgeon Washington Matthews, who gives the Navajo myth estimate of a trifle more than seven hundred years as the period of Navajo-Apache occupancy of the region in question.

To begin with the latter part of Mr Hodge's proposition first. Negative evidence as to the existence of the Apaches at any particular time in any particular region infested by them is very unsatisfactory evidence.

Simply because Castañeda de Najera does not allude to any such tribe in or about 1540-1541 does not prove anything. Castañeda's narrative may be found in Hakluyt. He was attached to the expedition of Vasquez de Coronado, moving out in search of the cities of Cibola, an expedition of most imposing dimensions. I forget the exact figures of its organization, but some idea of its strength may be inferred from Mr Hodge's

own statement, that it was accompanied by no less than "5,000 sheep and 150 cows of Spanish breed" (p. 237).

No one possessing the slightest acquaintance with Apache tactics needs to be assured that Coronado's force of mail-clad and *escapuled* Castilians and aborigines was not likely to be molested by the wary savages scanning their every movement from the hilltops.

Before arriving at conclusions in regard to the period of savage migrations, every possible source of information should be scrutinized and exhausted.

In the case of the Apache-Navajo these sources would appear to be for us:

1. The traditions of the natives themselves.

- a, of the Apache and Navajo.

- b, of contiguous tribes.

2. Historical data, whether as narratives of early missionaries, reports of military and exploring expeditions, municipal records, where such exist, church records, or history, properly so called. In the matter of history, the first is not always the best. In many cases writers of a later epoch are able, from force of circumstances, to present conclusions much more just than the assumptions, often arbitrary and fantastic, of the earlier commentators. A case in point is that of the Zuñi of New Mexico. A government publication can be named, dated about 1857, in which it is solemnly stated that Zuñi must once have been inhabited by pigmies because the doors are generally so low.

The traditions of the tribes adjacent to the Apaches are singularly harmonious in regard to the long-standing and consistent hostility displayed by that people toward all whom they met in their progress southward and southeastward.

No aboriginal tribe on the American continent—not even the Iroquois or Araucanian—knew so well how to apply the old Roman maxim of "Divide and rule." In moving down among the sedentary Indians, the Apache took good care to be always at peace with some while making forays upon others. Thus they kept on good terms and even intermarried with the Pueblos of Picuris, New Mexico, and came, in a friendly way, to trade in the first days of its foundation in front of the church of Our Lady of the Angelo of Porciuncula, whose ruins are still to be seen amid those of the pueblo of Pecos, fully described by Bandler.

In passing, it may be noted that this fact was related by a Benavides, apparently the same quoted by Mr Hodge.

And, strange to add, he says that they came with dog sledges, which would show that they were plains Apaches, and had been long enough on the plains to have become accustomed to the dog, which their brethren and the other tribes to the extreme west (Pimas, Opatas, Chimahuevis, Yumas, Cocopalhs, etc.) never employed as a beast of burden.

They maintained relations of intermittent friendliness with the people of Tucson, close to which town as many as 3,000 of them are said to have been congregated at one time; and yet, about the very same period, they made an attempt to burn down the church of the Pimas at San Xavier del Bac, nine miles up the river Santa Cruz.

A number of writers, among whom, I think, was Humboldt, have commented upon this phase of their nature. They would go so far as to plunder the settlements in Sonora and take the proceeds to the Rio Grande to sell to the Mexicans living along that stream. At various times peace has been made and kept precariously with Janos, Fronteras, Santa Cruz, Baviske, Basaraca, and other insignificant towns, and even at the date of the killing of the gallant Captain Emmet Crawford, Third Cavalry, United States Army, in 1886, the Oyata mountain hamlets of Nacori and Bacodeguachi were exempt from persecution because the Apaches wished to keep open some source of information as to what the Mexican troops were doing.

Apache-Navajo tradition, and Pueblo tradition as well, are concurrent in giving the Navajo country as the place of refuge sought by many of the Rio Grande Pueblos at the period of the great revolt, or, perhaps it might be better to say, at the period of the suppression of that revolt (1692-1694).

An archeologist might find in one valley the ruins of a village destroyed by the Apaches several centuries ago and not ten miles away come upon the traces of another which had managed to maintain some kind of relations with them until within a generation or two.

Thus Fronteras and Santa Cruz, already mentioned, were several times abandoned on account of Apache inroads, and then reestablished.

In 1866 I was taken by a party of Apaches to the ruins of a pueblo on the southern flank of the Sierra Acha, Arizona. "This

town was destroyed by a party of our people led by my grandfather, who was then a very young man. He destroyed this town in the night, carrying off the women and children. Our people used to keep at peace with those living over there" (on the foothills of the Sierra Matitzal and along the Rio Tonto). My informant was the chief known to the Americans as "John Daisy"—i. e., Pi-cha-indézi = Him, or His, Ear, Long—that is to say, "The Mule."

The eighteenth century was more than half advanced before the Apache drove the Sobaipuri branch of the Pima tribe out of Aravaypa cañon.

A scholar who made very painstaking and learned investigations into the former relations existing between Apache and Papago (Christian Pima) was the Right Reverend John B. Salpointe, who, when I first met him (1870), was the Roman Catholic bishop of Arizona.

So much for Indian tradition, of which more could be given were it not from fear of occupying too much space.

The measure of value to be assigned to Indian tradition is a vexed question, which each student must decide according to his own experience. I am willing to accept it in all cases as true, having due regard for the constant coefficient of ignorance attaching to every story related by people who have inadequate means of recording time or whose knowledge of the arts and sciences is meager; but it would be harsh and unjust to reject it altogether.

The Roman soldiers returning from the early Punic wars reported that the enemy had advanced upon them with beasts of burden which had *snakes for hands* (*anguimani*). We would call such animals elephants.

An Indian, who had made a hurried trip with a white friend from New Mexico, saw in the river below Saint Louis an animal with eyes of flame, vomiting steam from its nostrils and groaning more loudly than a wounded buffalo. He was telling about a steamboat. In 1881, at the ruins of "Tolla-hogandi," Arizona, a Moqui told Mr Thomas Kearn and myself that here had been a town of the Moquis, destroyed by the other Moquis because it was full of "singing men" and would not live like its neighbors.

I ventured the surmise (in "Snake Dance of the Moquis") that the "singing men" were Roman Catholic friars chanting vespers, and that "Tolla-hogandi" must be the old Christian Pueblo of

"Aguatubi," a surmise which Dr J. Walter Fewkes at a later date demonstrated to be beyond a doubt correct.

The Spanish history of North America may be said to begin with the expedition of Vasquez de Coronado from Culiacan northeast to the Arkansas or the Platte, as the scholar may elect. Of this expedition we have accounts by Coronado himself, by Jaramillo, and by Castañeda de Najera, and we also have the relations of Cabeza de Vaca and of Father Marco de Niza. Previous to this—that is, from the year that Cortés obtained control of Tenochtitlan until 1540—the reports of Cortés and the early missionaries describe facts in the present capital of Mexico with more particularity than those of any other point.

This was not all that the Spaniards were doing, but it was the principal part. Juan de Zumanaga, the first archbishop of Mexico, brought over the German Crombauer, with his printing press and set him to work at printing catechisms and "Artes" of the Aztec language, and a private citizen (name unknown) established, in 1543, for the education of Tarascan youth, a college which by 1583 had been raised to the dignity of a university, whose grand ruins are still to be seen on the island of Tzintzon-tzin, in Michoacan; but from the moment that Spanish writers began to direct their attention to the north, *then* we hear the cry of the Chichimecs! No words are too strong to delineate the diabolical character of the Chichimecs. They were wanderers from the north, going almost naked, and lurking in the suburbs of the largest towns and cities, at one time throwing Zacatecas itself into a panic.

Dr Gustav Bruhl, who devoted much thoughtful attention to the matter, translates "Chichimec" as "Mescal-eater."

Now the mescal, or American aloe, is and has been emphatically the food of the Apache. Furthermore, Torquemada ("Monarquía Indiana," Madrid, 1709, lib. v, cap. 40) says that the Apaches were the Chichimecs, although, for the sake of avoiding discussion, I am willing to include under the same head the Tarahumaris, the Comanches, and any other fierce tribes to the north.

But the word Apache itself, so far as now known, does not appear in any Spanish writing until we approach 1580-'81, when Antonio Espejo led an expedition from the mines of San Bartolomé to rescue two Franciscan friars who had penetrated up the Rio Grande certainly as far as the pueblo of Puay, not

far from which that of Sandia now stands. Torquemada relates that these two friars, Francisco Lopez and Agostin Rodriguez, were killed by the Chichimecs, who neither knew nor respected God, being like another Pharaoh. (Mon. Indiana, lib. xxi, cap. 14, p. 627.)

From this writer we get the name of the "Faraones" (Pharaohs) Apaches, a designation so long a blind to investigators.

Possibly from the Spaniards, too, has been derived our game of faro, which has been as great a scourge to us as the red-skinned Faro's or Faraones were to the Rio Grande.

Mr Hodge tells us that "the first Spanish known reference to the Apache tribe was made by Juan de Oñate. This was in 1598" (quoting from Oñate, "Obediencia y vassalaje de San Juan Bantisha," 1598, in Doc. Ined. de Indias, xvi, p. 114, where the word occurs as plain as day). Under the name "Apichi" they will be found spoken of in the accounts of Espejo's expedition, 1581-'83.

In most of the Spanish or Mexican references to this tribe they are arbitrarily designated as "Coyoteros," "Mescaleros," "Jicarillas," "Mogollons," etc., terms which are unknown to the Apaches and which are as illogical and misleading as Bancroft's classification under the one general head of "New Mexicans."

Escudero in ("Noticias Estadísticas del Estado de Chihuahua," Mex., 1834, p. 212) gives a list of nine "parcialidades" which correspond both to clans and to local groups (see my "Gentile Organization of the Apaches," p. 125, in J. of Am. Folk-Lore). The sixth of these, which he writes "Sejenne or Mescaleros," is, oddly enough, without doubt, Doctor Matthews' "Tse'jinkini, the House-of-the-dark-cliffs people. These are the descendants of the first two human pairs, who had their origin in the San Juan mountains, the first pair having been created by the gods from two ears of corn brought from the cliff houses in Tse'gihi, a cañon somewhere in the country north of the Rio San Juan."

But Escudero's "Sejenne" (pronounce the Mexican *j* like *hk*) is the Apache "Tzékinne," or people who live in the Aravaypa cañon, or in the *houses of stones* there to be found. Tze = a rock, kin = house. This would imply an admission in Apache or Navajo myth that "the first two human pairs" were a rock-house people or cliff-dwellers, and that the Apache himself was an intrusive element.

No fault can be found with Mr Hodge's view that the Apache-

Navajo movement to the southward gained in momentum with the conquest of the Rio Grande Pueblos and their subsequent revolt from the Spanish yoke, but still more did it derive strength from the weakness of Spanish vice-regal rule and the anarchy and turbulence immediately following the separation of Mexico from the mother country. Torquemada laments that the King of Spain has been for years compelled to maintain over four thousand dragoons to watch this tribe alone. (This has been fully explained in "On the Border with Crook.")

Mr Hodge is also correct when he describes the Apaches as a composite people, but all tribes and all nations, civilized or savage, are that.

The Apaches have solid bands, as among the Tontos, who not merely admit their foreign blood, but speak two languages—the Apache proper and the Mojave, closely related to the Hualpai, and claiming kinship with Pima and Cocopah. A Tonto chief, "Patchin," had a second name in the Mojave language, "Pula-Sara-trapa," or "the White-spotted Forehead" (Gentile Organization of the Apaches of Arizona, p. 113). Other members of the same band could be mentioned in the same manner, were it necessary.

The very name Tonto is a free translation of the Apache word *Bīñetinne*, spelled "Vinietinnenne" by Escudero, meaning stupid head or fool, and given by the other Apaches because they spoke so barbarously.

"Eskiminzin," one of the head chiefs of the Apaches, is of part Mexican blood. The tribe is full of Mexicans, with occasional Pima, Opata, and Tarahumari captives, not a few of whom have risen to power and influence among their captors.

But as the Roman—born in Spain, in Mantua, Capua, or Lutelia—no matter what might be the nationality of one parent, always claimed to be a Roman, so the Apache is the dominant blood at all times among this savage people, and Apache each and every one claims to be and is.

In the literature of this subject there is a very important and interesting report by Don Hugo O'Connor, an inspector-general of the Spanish army; another by a certain Colonel Castro, who lived among the Apaches for seven years, was acquainted with their dialects, and had an intelligent appreciation of their peculiarities, both in peace and war; there is a shrewd letter concerning Moquis and Apaches by Father Eusebio Kino, and some

information of value in Father Alegre's History of the Company of Jesus in Mexico, itself based upon the work of his predecessors in the missionary field, but not always exact in the matter of dates.

JOHN G. BOURKE,

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REPLY OF MR HODGE.—It is for some reasons to be regretted that Captain Bourke has taken occasion to criticise certain passages of "The Early Navajo and Apache" before consulting the notes to which he alludes, for over-reliance on his memory has led him to err in a number of statements.

A careful perusal of my paper will show that the mere fact that Castañeda (whose narrative does not appear in Hakluyt, as Captain Bourke supposes, but in Ternaux-Compans) fails to mention any tribe that can be identified with the Apache, notwithstanding his detailed description of every noteworthy occurrence, is only a small part of the evidence presented in support of my argument that southern Arizona and northern Sonora were not occupied by the Apache in the sixteenth century. It will also show that even in the early part of the seventeenth century the sedentary peoples of New Mexico and Arizona were not molested by the Apache or Navajo; therefore the "tactics" of the Apache of early times were quite different from those with which Captain Bourke has had such a wide and thrilling experience. Even had the Apache taken to the heights on the approach of the Spaniards, the latter could not have failed to observe signs of habitation in the despoblado between the Gila and Zuni, had there been any.

Captain Bourke presents no evidence, so far as I can see, of the early occupancy by the Apache of the White Mountain region in Arizona. The fact that "the traditions of the tribes adjacent to the Apaches are singularly harmonious in regard to the long-standing and consistent hostility displayed by that people" is of little moment. "Long-standing" hostility to the Indian may mean a period not exceeding a century or so, for in many instances the Indian's conception of chronometry beyond a very brief period is quite vague. For example, the Tiwa of Isleta relate a tale of "The Man Who Wouldn't Keep Sunday," the home of this impious individual having been a *prehistoric* pueblo; and another regarding the destruction of Pecos, which bears every

indication of antiquity, yet it is known that Pecos has been abandoned only about half a century. It should also be remembered that the association of the Apache with Pecos and Picuris, to which Captain Bourke refers, occurred nearly a hundred years after the coming of Coronado, and it would have been strange had they neglected to follow other nomads (the Querecho or Tonkawa, for example, who traded with the Pueblos) in the use of the dog as a beast of burden, for the plains tribes had that animal under domestication before the Spaniards came.

Captain Bourke is mistaken also in his supposition that the first actual Spanish reference to the Apache was made prior to 1598. The two Franciscan friars mentioned, accompanied by Chamuscado, went, in 1580, as missionaries to Puaray (Coronado's town of Tiguex), where Bernalillo now stands, but were killed by the inhabitants of that village in the same year. Eighteen years later Oñate there discovered on the walls of a room a partially effaced painting representing the killing; hence the "Chichimecs"—a term applied in Mexico to *any* wild Indians—to whom Torquemada attributed the killing, were in this case not Apache, but only "peaceful" Pueblos. The name Faraones, as applied to a division of the Apache, was not employed until the eighteenth century, while the name "Apichi" (really "Apiches"), mentioned by Captain Bourke, occurs not in Espejo's narrative, as he supposes, but in Oñate's letter of March 2, 1599, published in the Documentos Inéditos del Archivo de Indias, xvi, p. 308.

The bare fact that the Apache and Navajo are composite peoples is unimportant, save in so far as it is possible to trace the mixture in their kinship to a very early date, and another perusal of my paper will, I think, remove any impression that I have been endeavoring to establish what is already well known to every one. The writings of O'Oonor, Castro, Kino, and Alegre are all comparatively recent; hence shed no light on the *early* Navajo and Apache, to whom alone my little paper is devoted.

If on future examination of his notes Captain Bourke succeeds in gaining further information regarding the ancient habitat and condition of the Apache, I shall be very glad, but in view of the numerous errors into which my critic's memory has led him, I see no reason whatever for changing any of my previously published conclusions.

F. W. HODGE.

ALEXANDRA V. POTANINE, who died in China in 1893, was a most indefatigable traveler, having accompanied her husband, Grigorii Potanine, in his journeys through Siberia, Mongolia, Tibet, and China for nearly twenty years. She was an active and efficient assistant of her husband in his work of exploration, particularly in meteorological observations, in keeping the journal, and in having charge of the collections, for which latter work the Imperial Russian Geographical Society awarded her a gold medal. She also has done much independent work in studying and describing the life of the peoples among whom she lived, and her writings, published from time to time in Russian periodicals, form a valuable contribution to our knowledge of the life of the Orient. She died a victim of her zeal for the work of exploration. Having been taken sick with fever, she insisted on continuing the newly planned route and died on the way before reaching Pekin. Her remains were interred at Kiahta, on the Russian frontier.

The Russian Geographical Society has honored her memory by publishing, in a separate volume, a collection of her works, with the addition of a biographical sketch and a portrait of the author.

Mme. Potanine's writings consist principally of ethnological sketches of the native inhabitants of northeastern Siberia and central Asia, and her descriptions of the customs, religion, and mode of life of these peoples are remarkable in their clearness and impartiality. Her powers of observation were very keen, her sympathies broad, and her mind cultivated and well informed. Her style is extremely simple and popular. Some of these essays were written expressly for publications intended for the instruction of young people in Russia, as, for instance, the story of "Dorgie, the Booriat Boy," and the article "Mongolia and the Mongols."

Her description of Tibet and the government of the Dalai-Lama is valuable and interesting in its details. The study of the religion of Tibet is most exhaustive. She had personally visited two large Tibetan monasteries, and spent a whole winter in that of Gumbum, in northern Tibet.

JULIE MINDELEFF.

A SECTION of anthropology has been organized in connection with the Academy of Natural Sciences of Philadelphia. Dr Harrison Allen is chairman.

THE ALLENTIAC LANGUAGE OF ARGENTINA.—Mr J. F. Medina, the well-known Chilian archæologist, has discovered and republished the only copy known to exist of the Jesuit Father Luis de Valdivia's "Doctrina Arte Voc," etc., of the Allentiac language, now extinct, but formerly spoken by the Guarpe Indians of Cuyu. The famous missionary published his book in Lima in 1607, and it is a most precious little volume in every sense.

The Guarpes seem to have been cave-dwellers. Their word for "water" is *caha*, a possible representative of the well known root word *co'*, so general in South America. The personal pronouns are: *cu*, I; *ca*, thou; *ep*, he, she, it; *cucha*, we; *cacha*, you; *epcha*, they. *cu*, I, makes *cuch*, my, and in this state is used as the possessive prefix; *e. g.*, *cuch piu*, my father, and so on of the rest; *ep* goes into *epech* for phonetic reasons.

The verbs require an auxiliary, and, with its personal ending, it forms the flectional suffix; *e. g.*, *quilletc*, love (as verb); stem, *quilletc-a*; *quilletc a-nen*, I love. The other personal suffixes are: (2) *-npen*; (3) *-na*; (pl. 1) *-cnen*; (2) *-mnecpen*; (3) *-mna*. The adjective precedes the substantive.

Interrogative and negative conjugations differ slightly in their affixes from the others, and the same thing happens when the accusative of the personal pronoun is affixed. The principal of these are: *Que*, *queunmíte*, me; *xque*, *quer*, *xqueunmíte*, us; *ca*, *caye*, thee; *xca*, *car*, *xcaunmi*, ye; *pu*, him; *pux*, *xpu*, them.

The auxiliary or substantive verbs are several, and their roots are *he*, *a* or *ha*, *ca*, *na*, *lta*.

Ipu is the prefix of past time.

The vocabulary is like nothing else we know in this country; but we are following traces of the grammatical particles. The pronouns seem very like something in the Chaco-Guaycuru' group, and the postposition *Tu* is too general to be passed over as a chance analogy.

It is to be regretted that Mr Medina has printed only 200 copies of his beautiful edition. He is to be heard of at Seville.

The undersigned has almost ready for the press an essay on this most interesting language, with a translation of the catechism, etc., and an inversion of the vocabulary into Allentiac-Spanish.

SAMUEL A. LAFONE QUEVEDO.

PILCIAO, ARGENTINA.

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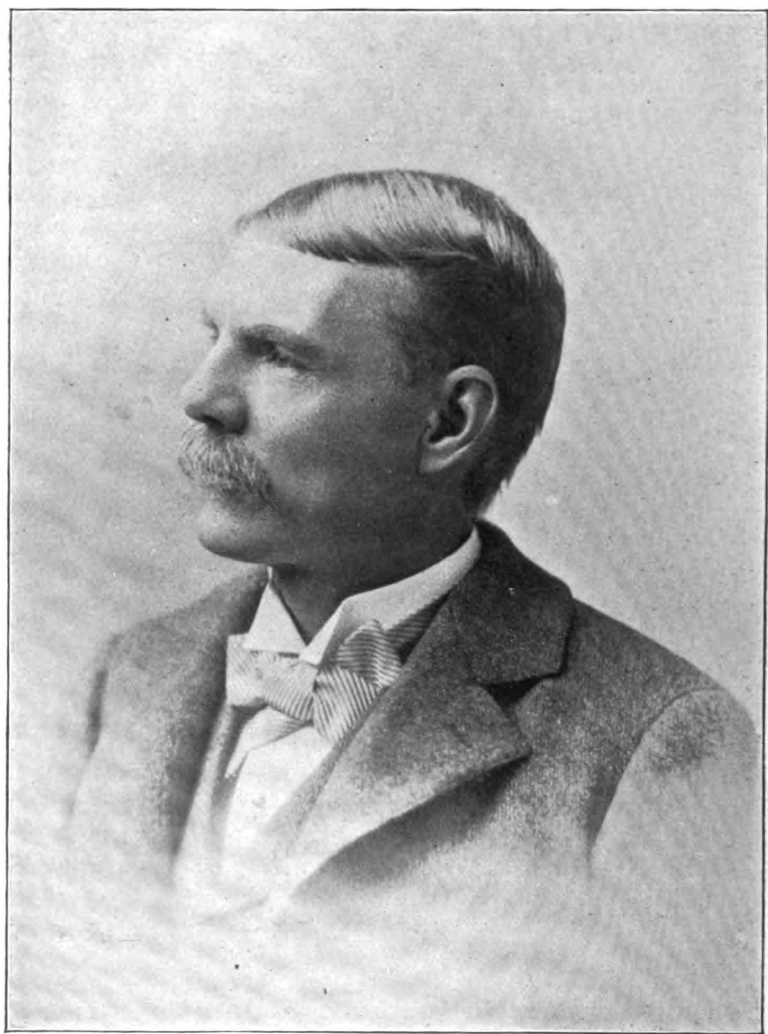
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James C. Felling

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THE ARROW *

BY FRANK HAMILTON CUSHING

I

ITS ANTIQUITY

One of the most ancient of the things men have made is the arrow. There is no weapon the lineage of which can be unbrokenly traced further or to a simpler beginning. We have been apt to lose sight of this through associating as inseparable, alike in origin and use, the *bow* with the arrow. But I think it can be shown that the arrow had been perfected in well nigh all its parts, had attained rank as the chief weapon and one of the supremest possessions of man, and had given rise to a surprising variety of things and uses long ere the simplest bow had been conceived of or fashioned.

If this be true, then the arrow in its ancestral or embryonic form at least, was as old as either the stone axe or the shaped knife of flint, if not older; was, in fact, coeval with the knotted clubs and rough stones men picked up at need in the wilds they earliest traversed; and we can see that through javelin and dart and harpoon it was sprung from the spear and lance, as they from the fire-sharpened pike, and this from the mere pointed stick—made sharp not by art, but by use—for digging or hurling, by turns.

* Vice-Presidential address before Section H of the American Association for the Advancement of Science, read at Springfield meeting, August 20, 1895.

II

ITS INFLUENCE

Again, there is no weapon and no single thing that for ages held sway so potent over the minds or the destinies of men, or wrought more varied influence over their institutions and customs than did the arrow; for I think I can also make clear the fact that as it was the chief reliance and resource of primitive man in the two main activities of his life, war and the chase, it speedily became his first, and ever remained, by representation at least, his highest, instrumentality for divining the fate or fortune its use so often decided, and in this way came to affect as no other single object of art ever did, the development and history of mankind in general the wide world over.

There is far more basis, then, than mere romance and beauty of comparison, for the poetic meaning of the arrow of literature, from Biblical and classic allusions, to Shakespeare's own. "Jove's thunder-bolts" or "Cupid's darts," "Diana's arrows" or the "shining shafts" of Apollo, or of "Death" and "Destiny," were real arrows to the men of old time, for to them the love pang was an actual wound from a random and puny childish shot. The sharp pain of mortal throe or the slow anguish of fleshly ill was from a veritable stroke of the cold, breath-sent shaft of ghostly foe-man, or was the ceaseless rankling of some venomed barb of envious wizard or gaunt hungering demon.* The fire streak of the skies, the bright rays of the sun, the stinging flight of the sand-blast or hail-storm, and the sudden frost-bite—all of these were, indeed, to them the very counterparts and relatives of their own man-made but magically fashioned and feathered missiles. "Straight," "true," or "quick" as "an arrow," "sure as a shot," meant more to them than to us, for the force of such phrases never wore out so long as archers held their sway and men spake, like Homer's heroes, with "winged words."

* Thus the Zuñi name for a swelling is *sho'li'na* (from *sho'ole*, an arrow, and *i'na*, the content, the innermost element, quality, substance, or cause of a thing), and literally rendered means "arrow in it" or "arrow-caused." Thus, too, rheumatism is called by the Zuñis the "*sholi've evil*" or "*disease of arrows*;" and in treating this malady their medicine men try, after due manipulation of the affected part, to pluck forth the misty arrows or barbs they suppose are within, with magical snare-wands of eagle-feathers, blowing lustily the while to cast out these poison-missiles and thus keep them from harming others or themselves.

III

ITS RELATION TO ANTHROPOLOGY

In presenting to you, then, a study of the arrow, I am not departing so far as might seem from the requirements of the high office you have so kindly called upon me to serve, for I would offer something characteristic, not so much of a field, as of a method and standpoint of investigation which I believe to be peculiarly adapted to the needs of our science; and I would illustrate, and hope I can measurably demonstrate herein, how special lines may and should be followed to general, and as far as can be, to universally applicable conclusions, these tendered not dogmatically, but suggestively; that we may select, say, single phases and arts of humanity and even local manifestations of them, and should not only present, but study them, subjectively rather than objectively; not externally and categorically or as isolated phenomena, or as mere examples of racial similarities and dissimilarities, nor yet, primarily, even as to whence they came ethnically, but rather, as to how and why they became at all, and originally,—as illustrations, that is, of the laws and principles which have governed man's development under all sorts of circumstances and in every age and land.

It is in this spirit, at least, that I treat of the arrow; not as a weapon merely, not descriptively to any greater than needful extent, but in its relation to the history of man and his culture-growth; as an illustration equal to any, I believe, of how certain few human things and activities have been born (often so simply as to have been inevitable wheresoever man chanced to dwell), and of how they have grown, also very naturally and independently of at least deliberate devising, and in so doing have sometimes given rise to multitudinous other and diverse things and activities, thus profoundly affecting man's psychological as well as racial development, and hence contributing inexorably both good and evil lessons and influences to his culture everywhere, and everywhere similarly.

If, moreover, I am at times seemingly too personal in style of statement, let it be remembered that well-nigh all anthropology is personal history; that even the things of past man were personal, like as never they are to ourselves now. They must, there-

fore, be both treated and worked at, not solely according to ordinary methods of procedure or rules of logic, or to any given canons of learning, but in a profoundly personal mood and way. If I would study any old, lost art, let us say, I must make myself the artisan of it—must, by examining its products, learn both to see and to feel as much as may be the conditions under which they were produced and the needs they supplied or satisfied; then, rigidly adhering to those conditions and constrained by their resources alone, as ignorantly and anxiously strive with my own hands to reproduce, not to imitate, these things as ever strove primitive man to produce them. I have virtually the same hands he had, the same physique, generally or fundamentally the same activial and mental functions too, that men had in ages gone by, no matter how remote. If, then, I dominate myself with their needs, surround myself with their material conditions, aim to do as they did, the chances are that I shall restore their acts and their arts, however lost or hidden; shall learn precisely as they learned, rediscovering what they discovered precisely as they discovered it. Thus may I reproduce an art in all its stages; see how it began, grew, developed into and affected other arts and things—all because, under the circumstances I limit myself to the like of,—it became and grew and differentiated in other days.

If the subject be in paths somewhat different from this, as, for example, some portions of my present essay are, I shall also think of it as it related to primitive men in primitive state of mind. I would divine how the men of old felt about their arrows, and what, therefore, they did to them and with them. They were simple, like little children, given to looking on their favorite things as the children of today look upon favorite toys, with a vast deal of personal feeling, emphasized in their case, to huge proportions, by the tremendous part these arrows bore in their lives. They had no knowledge of physics to guide them. Analogy was their explanation of relations, and the dramatic interpretation of these relations and the phenomena thereof their only logic, and so, behold, the arrow was for ages looked on as a wand of enchantment to those who made and used and lived by and loved it; was to them a symbol—a veritable portion and potency of the mightiest forces and beings that they thought the world and four quarters, the sky, or the under earth held; was

thus transcendent over the skill of their dearest archer; was a thing of magic, and was willful, as like to obey the wind-bird with whose feathers they had winged its shaft withal, the god in whose breath it wavered, as to obey themselves or him who wrought and loosed it; for itself would decree his luck or his fate, not he who sped it, else why all so vainly at times, however great his skill or his effort, did he speed it? Therefore it played as large a part in their theoretical and mythical as in their practical life, and must be theoretically and imaginatively, no less than practically and experimentally, studied.

IV

MY DISCOVERY OF ARROW-MAKING

I tell you in detail, then, how, through making many arrows, I have studied the arrow and its development practically; how, by using it unweariedly and consorting long with those who used it actually with natural purpose and method, as well as by pondering deeply upon it in the most primitive moods I could muster, I have studied, theoretically, too, its meanings and relations; the place it held in men's hearts and minds ere ever they knew of goodlier friend or deadlier foe.

When I was a boy less than ten years of age, my father's hired man, while plowing one day, picked up and threw to me across the furrows a little blue flint arrow-point, saying: "The Indians made that; it is one of their arrow-heads." I took it up fearfully, wonderingly, in my hands. It was small, cold, shining, and sharp—perfect in shape. Nothing had ever aroused my interest so much. That little arrow-point decided the purpose and calling of my whole life. It predestined me, ladies and gentlemen, to the honor I have in addressing you here to-day, on Arrows; for I have studied archeology far more, alas, than anything else—ever since I treasured that small arrow blade on the lid of an old blue chest in my little bedroom, until the cover of that chest was overfilled with others like it and with relics of many another kind.

I was fortunate enough, not long after, to find in a neighboring field a place where some of these blades had been made. I could see that they had been fashioned in some way by chipping, for the scales lying there were like those I had been wont

to strike off to see the sparks fly. When in course of time I had gathered a collection of some hundreds of relics from all over central and western New York, I began a series of experiments to learn how these arrows had been made. No one could tell me, and I had no books on subjects of anthropology then.

There was a farmer in our neighborhood who, when young, had gone to California. It was in the days of "Forty-nine," and he had been pricked in the shoulder by an Indian arrow. He may not have killed the Indian, but had, at any rate, his whole sheaf of arrows—quite as perfect a set as I ever saw. They were all pointed with obsidian tips, like mine in shape and finish, but smaller. In recognition of my passion he gave me two of them. I thought the points were of glass, and forthwith added all the thick pieces of bottle-glass and window-plate I could gather, to my store of raw material for practice. With this I worked, now and then, throughout a whole season, but the products of my hammerings, though fair, were but crude compared with those of the field.

When nearly fourteen years of age I discovered in the woods south of Medina, New York, an ancient Indian fort. I built a hut there, and used to go there and remain days at a time, digging for relics while the sun shone, and on rainy days or at night in the light of the camp-fire, studying by experiment how the more curious of them had been made and used. One evening I unearthed a beautiful harpoon of bone. I had a tooth-brush. I chopped the handle off and ground it down on a piece of sandstone to the shape of the harpoon blade, but could not grind the clean-cut barbs in its edge. I took my store of flint scales and set to work on it, using the flint flakes in my fingers, or clamping them between split sticks, saw-fashion. The flint cut the bone away as well as a knife of steel would have cut it, but left the work rough. Now, in trying to smooth this I made a discovery. No sooner had I begun to scrape the bone transversely to the edge of the flint than the bone began to cut the flint away, not jaggedly, as my hammer-stone would have chipped it, but in long, continuously narrow surface flakes wherever the edge was caught in the bone at a certain angle. I never finished that harpoon. I turned it about and used it as an arrow-flaker by tying it with my shoestring to a little rod of wood for a handle and pressing it at the proper angle to points on the flint which I wished to re-

move. I made arrow after arrow thus, in the joy of my new discovery, until my hands were blistered and lacerated, in one place so deeply that the scar remains to this day, and, worn down to a mere splinter, I still preserve my first tooth-brush flaking tool. (Fig. 1.)

I did not know at that time that archeologists the world over were ignorant, as I had been, of just how flint implements had been made, and I did not learn until my now so lamented friend, Professor Baird, called me to the Smithsonian Institution, in 1875, that I was the first man, or rather boy, of our day who had practically discovered how to make implements of glass and flint flaked from side to side, and in this indistinguishable from those made by primitive peoples.

I have told this history as it occurred for a three-fold reason: first, to instance the manner in which I discovered flint-flaking, by chancing all ignorantly to follow precisely the course primi-



FIG. 1.—Experimental flint-chipper of bone.

tive men must have necessarily followed when and as soon as with the hardest and sharpest stone they could get, which was fractured flint, they tried to scrape and fashion bone or horn; and, secondly, to convey to you the lesson this boyish experience taught me; that I could learn more by strenuously experiencing with savage things and arts or their like than others or I could have learned by actually and merely seeing and questioning savages themselves about such things and arts. Long before I went to the Smithsonian or lived in Zúñi I had elaborated from the simple beginning I have chronicled here, some seven or eight totally distinct methods of working flint-like substances with Stone-age apparatus, and subsequently have found that all save two of those processes were absolutely similar to processes now known to have been sometime in vogue with one people or another of the ancient world, and I confidently look to finding that the other two, and yet additional methods since experimentally made out, were somewhere followed by men before me. And, thirdly, there is another lesson of later development this

experience has taught me: that paleolithic man, of the French caves at least—that man who is said to have known no other art of working stone than by rudely breaking it into shape by blows of other stones—could not have existed in such primary status of art for more than a few seasons at most; for even the casts of these cave remains that I have seen show carvings in bone and reindeer horn finished to such nicety and cut so elaborately that with the splendid true flint of Europe, experience in making any one of them would have given birth to the wit of making and applying a hundred flaking tools. As might be expected, therefore, I find among the casts of the French cave objects in our National Museum and in the University of Pennsylvania several fine and well-worn flint-pressers, a flaker or two, and reproductions of even one knapper of horn, and all these things are polished with art as of polished stone.

V

THE TYPICAL ARROW

Before I briefly relate and show how arrows of the ancient world were made I must need describe them, but not in all their variety and detail.

Those of the American Indian are, as a whole, fairly representative of all others, and to the student who would become familiar with the characteristics of nearly all classes of these I would recommend that most excellent and admirably illustrated "Essay on North American Bows, Arrows, and Quivers," written by Dr Otis T. Mason and published in the Smithsonian Report for 1893, to which I am myself so much indebted.

You are all familiar with the toy and target arrows of our time, but you may not be aware that all toys, wherever found, with the slight exception of but a few very modern and mongrel mechanical devices, are survivals of either the weapons and utensils or else of the religious paraphernalia of antecedent times, and that this familiar arrow of the archery clubs is no exception to the rule, but is an excellent representative in all essentials, save only for its blunted pile, of the arrow that won our pre-eminent place in the world—the arrow of the Norman Conquest, of Cressy, Poitiers, and Agincourt, of old England's matchless bowmen. But still it is not quite typical of its prehistoric kind.

The arrows of the Age of Stone may be best represented, I think, by one of their most highly developed forms—that of the famous Cliff-dwellers of the southwestern cañons, for in this we find combined the features of nearly all other kinds. In that matchless collection of very ancient remains from the cliffs gathered by the Wetherell Brothers and the Jay Smith expedition and now owned by Colonel C. D. Hazzard, of Minneapolis, which is on exhibition, I am happy to say, in the Museum of the University of Pennsylvania, are many specimens of this arrow (Fig. 2). They are from thirty inches to nearly a yard in length; are tipped with delicately flaked, diminutive points or piles of chalcedony or obsidian. Some are barbed and tanged; others are merely triangular; but each is set into a nock or deep notch at the point of a tapering, hard-wood fore-shaft, and firmly attached thereto by alternate cross-wrappings of sinew. The fore-shafts are about half as long as the shafts or steles, which consist of medium-size reeds or canes, and are fitted with shoulders and thence tapered sufficiently to be let into these slightly smaller ends three or four inches—far enough to rest against the stop or septum of the first joint—and are held in place by a seizing or binding of sinew around the shafts at the points of insertion.

The steles or bodies of these cane rear-shafts are some of them grooved with long, straight, or wavering lines, and are not only winged at the shaftments or base ends with feathers, but are also footed—that is, the extremities have been split slightly at four, sometimes only three, equidistant points, and plugs of wood have been set into them and bound in place by sinew to receive the nock for the bowstring, somewhat as strips of hard wood are let into slots of our spruce target arrows to keep them from split-

FIG. 2.—Foreshafted reed arrow of ancient Cliff-dwellers, showing tip, foreshaft, and footing-plug insertions.



ting when drawn or loosed. Each of these arrows is winged with three half-plumes, mostly split from the first six pinion feathers of eagles or falcons (for they happen, with one or two exceptions, to be war arrows), which are laid equidistantly along the shaftment the length of one's palm and forefinger down to within an inch, more or less, of the footing, and seized at the ends with sinew and glue. One of the plumes of each arrow, called the "tail" by the Indians and the "cock feather" by the old English archers, was placed so as to stand out exactly at right angles with the nock of the arrow, and, as I shall presently show, was most significantly tufted and notched, primarily to denote that it was to be uppermost when the arrow was nocked, so that neither of the opposite feathers or "wings" should touch the bow when the arrow was loosed from the string.

Finally, around the shaftment, between the feather-seizings, bands or ribands of color were painted, red and black, chiefly, and variously disposed, also most significantly, as we shall soon see. Arrows of the kind I have just described are called "compound." Arrows with shafts made from single rods of wood are called "self" arrows, and, strangely enough, although apparently simple, they more often than not have tokens of derivation from the compound kind, and the successful making of them was much more difficult.

VI

THE MAKING OF ARROWS

As shown by my experiments of many years, by the scattering allusions of travelers, and, more than all, by my life with an archaic, very archaic, people, the steps in the manufacture of arrows, of their points of flinty stone, which men of primitive days most widely followed, were few and simple, yet exceedingly curious and ingenious.

They first sought the material, mined it arduously from buried ledges with fire, mauls, and skids,* or, preferably, when the country afforded, sought it in banks of boulder-pebbles, digging such as were fit freshly from the soil, if possible, and at once blocking

*The reader is referred to the various masterly essays on this subject by Mr. Wm. H. Holmes and one by Mr H. C. Mercer, published in former issues of this magazine.

out from them blanks for their blades by splitting the pebbles into suitable spalls, not by free-handed percussion, but by holding them edgewise on a hard base and hitting them sharply and almost directly on the peripheries, but with a one-sided twist or turn of the maul or battering stone. With each deft stroke (Fig. 3) the spalls, sometimes twenty from a single cobble or block of moderate size, were with almost incredible rapidity trimmed to the leaf-shape basis of all primitive chipped tools by knapping them with a horn, bone, or very soft, tough, granular stone hammer mounted in a light

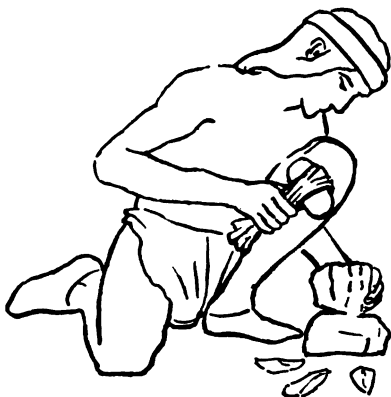


FIG. 3.—Splitting spalls or flakes from mass for blade-blanks.

handle. For this the spall was placed flatwise on the knee or on a padded hammer-stone, so called, and held down by the base of the thumb of one hand (Fig. 4) and rapidly struck along the edge transversely and obliquely to its axis lengthwise, with

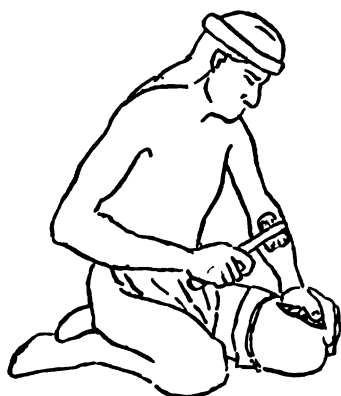


FIG. 4.—Knapping or shaping blade-blank from spall.

the outwardly twisting kind of blows used in the splitting. The blanks thus formed were then carried home for leisurely or opportune finishing, and carefully buried in damp soil, not to hide them, as has been usually supposed, but to keep them even-tempered or uniformly saturated ("full of sap and life," these ancients thought), whence the so-called "caches" of numerous leaf-shape blades which are now and then found, for example, throughout old Indian ranges.

In finally forming arrow-points from these trimmed blanks, the smallest of them only were chosen. The first care in fashioning one of these was to remove protuberant points from its

edge and sides and to thin it down by means of a pitching-tool of buck-horn. This was effected in several ways, usually by clamping it in a folded pad of buckskin under the knee against a hammer-stone or notched wooden block, so that the projecting edge rested over the margin or else over the pit of the stone, or notch if a block or log were used, and with one hand holding the point of the pitching-tool very lightly and slantingly and at a wide angle, against or just over the points to be chipped, sharply tapping the tool with a maul or with a knapping hammer (Fig. 5). Thus the blade was quickly thinned down and made almost even-edged. It was now further shaped, sharpened, notched, or barbed or serrated, according to intended use, and tanged, with a rounded, flat bodkin of horn (seized to a stick or handle for leverage at one

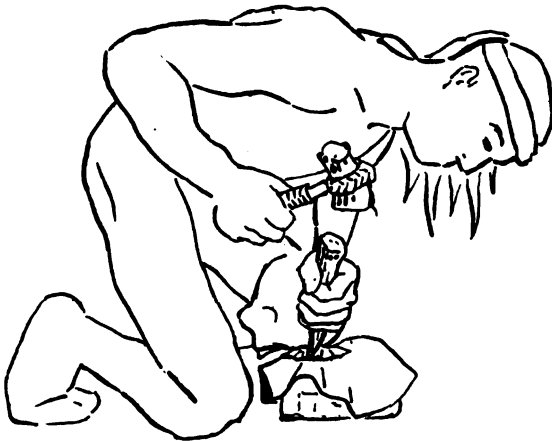


FIG. 5.—Pitching or trimming blade.

end and tapering therefrom to a curved, blunt point), either by laying it on folded buck-skin, over the hollow of a hammer-stone (Fig. 6) or the palm of the left hand, pressing it downwardly along the edges at nearly right angles, and al-

ways slantingly to its length, or else by holding it edge up between the thumb and all the fingers of the left hand and freely flaking it, with the rod held in the right hand (Fig. 7), with handle braced against the ribs for steadying, by pressing the sharp edges until they caught in the point or blade of the bodkin, and twistingly wrenching them off by a most dextrous motion, which I can exhibit, but not adequately describe or illustrate.

All this sounds complicated and tedious, but I have succeeded from the time I found a suitable pebble of fine-grained, ringing, cold and fresh quartzite, in making seven finished knife and arrow

blades in exactly thirty-eight minutes, and I have often made from obsidian or glass a very small and delicate arrow-point—the most easily made, by the way—in less than two minutes.

When a number of the points had been finished they were warmed by the fire and rather ceremoniously enwrapped in buckskin or fur, not more to keep them safe than to “cure” them of all this rough handling and win them to favor and strength, for by the very clink of the perfect ones it was known now that they were full of life, each of its own—the life and fire of the lightning, which could be seen at night when they were rubbed or struck against one another or ground on a sharpening stone.

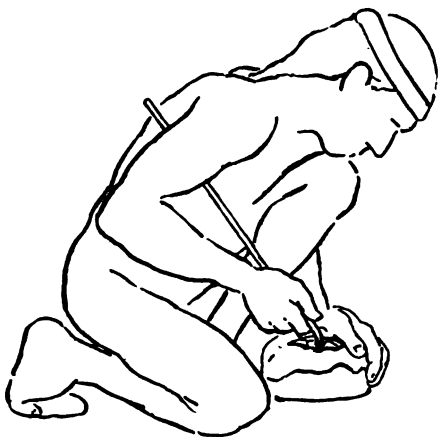


FIG. 6.—Chipping by downward pressure.



FIG. 7.—Chipping and notching by cross pressure or wrenching.

When war work was impending these old-time artisans or fletchers went forth “sprout making and cane-cutting,” as they called their gathering of reeds and twigs; or when later, as the Pueblos did, they abandoned the compound arrows of their ancestry and took to horse and short bows, they called it “cane-sprouting” when they gathered, all green, their shaft twigs, or “browsing” when they designed them

to serve for the chase. These twigs were cut with due sacrifice to the wood sprites, were brought in head or upper ends fore-

most, passed over the store of points to make them acquainted, and laid down with their tip ends to the east or south if for the peaceful hunt, to the west or north if for war. They were peeled upwardly, or from butt to tip, that their way of working be not balked; scraped and shaved to uniformity, also from the butt upwards, and placed alongside a hot fire or buried in moist, hot sand to soften or "ripen" them; and then, after being bitten straight in the most crooked places (Fig. 8)—it did not much matter how crooked they were at first—each in turn was clamped between one nether, grooved piece of sandstone or sanded wood



FIG. 8.—Shaft-biting for preliminary straightening.

and one small flat piece held over it firmly in the left hand, and was shoved and pulled twistingly back and forth until smoothed and rounded and further straightened (Fig. 9). Finally, each was both seasoned and polished, then straightened to a nicety by passing it, under heavy pressure, over a smooth grooved piece of very hot soapstone, or else, better still, by heating it and "stretching" it through a veritable draw-plate of bone, horn, or hard wood (Fig. 10) furnished with a single medium hole or with several beveled perforations. While being stretched the shaft was wrenched with a quick turn here and there at remaining crooked places, then smoothed

down by additional and gentler stretching, that it might be coaxed to keep straight. When fully stretched, it was grooved along three or sometimes four places on its circumference with the tusk of a puma or wild cat (of fiery eye) if for war, with elk, beaver, or other gentler kind of tooth if for the peaceful chase. With the point of this tooth the shaft was pressed alongside of the stretching plate as it was being finally pushed through from tip to shaftment place (Fig. 11) or feathering point—twistingly for at least every alternate groove—that a wavering trail might be made for the lightning to traverse from point to quill when the feathers whistled, speeding the sure flight of the arrow.

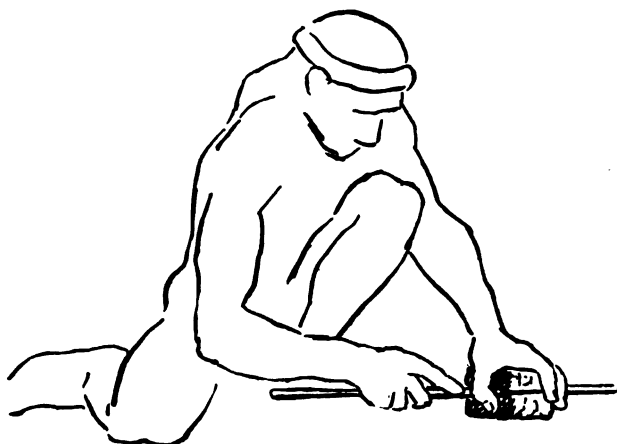


FIG. 9.—Shaft smoothing by grinding.

The shaft came forth from this operation lengthened considerably, polished, groove-marked, straight in the main, but bent perhaps along its full length. If so, it was warmed along the inner curve of the bend, held, tip outward, in the left hand, the butt grasped by the right (Fig. 12), and was bent a little this way and that till true, held so a moment, and laid down close to the fire, where it speedily dried to rigid straightness, until perchance rained on. The shaft was nocked at the lower end first by notching it deeply with a flint sawed across (but more or less with) the grain and by rasping out the bottom of the notch with a blunter-edge knife or sanded string and by heating, and spreading the flanges thus formed with a rib or other

hard edge or with a hot stone. If a split appeared or was likely to appear, the foot was whipped with sinew.



FIG. 10.—Shaft "stretching" or final straightening with draw plate.

Now it was ready for feathering. Three pinion feathers, all from the right or all from the left wing of eagle, hawk, or turkey were chosen and cleft from tip to base by splitting and pressing the quill apart along its inner groove or mid rib. The featherings were all chosen from corresponding sides of the mid rib, that they might be uniform. The pith was scraped out of the lower parts of the quills until they were thin and flexible, and the edges of them were pared away. They were now laid flat along the shaftment, the bases of the quills toward the tip, first the right-wing quill, then the left-wing quill, so called; finally the tail quill; the latter transversely to the neck to serve as a cock feather.

All were seized on with filaments of mouth-moistened sinew, one end held in the teeth until a turn or two of the wrappings had been taken to keep the feathers in place. Then one end of the shaft was held under the left arm, the other between the thumb and forefinger of the

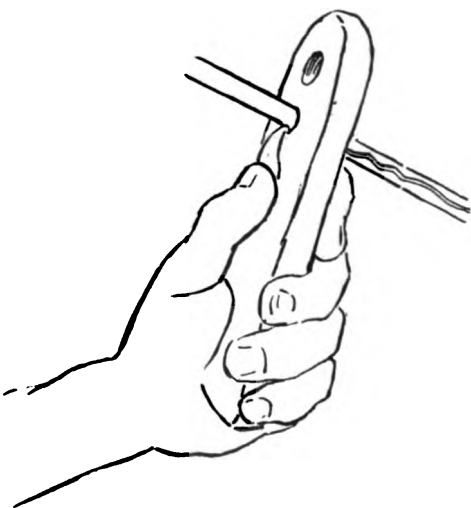


FIG. 11.—Shaft grooving with tooth and draw plate.

left hand (Fig. 12 a b, a). The thumb and the fore and middle fingers of the right hand were moistened, and with them the shaftment grasped over the first wrapping. The sinew filament was drawn taut and held so between the middle, little, and ring fingers and the edge of the palm, and the shaft rapidly twirled with the thumb and fingers of the left hand (Fig. 12 a b, b). Thus the bindings of sinew were pressed flatly and tightly on as it was wrapped, and, being moistened and very fine at the ends, adhered without further fastening.

Now the lower ends of the featherings were similarly fastened, some of the pluming or alæ being usually seized on together



FIG. 12.—Shaft-truing.

with the quill to strengthen and tuft it, and the plumes being stripped down once or twice spirally with a double motion to make them lie flat, were finally pulled through at the ends to straighten them, and flatten them still more.

After all the shafts had thus been feathered the whole bunch was taken in hand, the butts struck against the ground or a stone, then reversed and righted, and with a puff of the breath thrown down, ends forward. According as the arrows rebounded and fell, they were carefully sorted into groups, and with the more highly developed tribes, like the Zufi, the cock or tail feathers

of each group were notched, trimmed, and tufted differently from those of the other groups, to denote their classes as being, one set of the north, another of the east, and the others, respect-

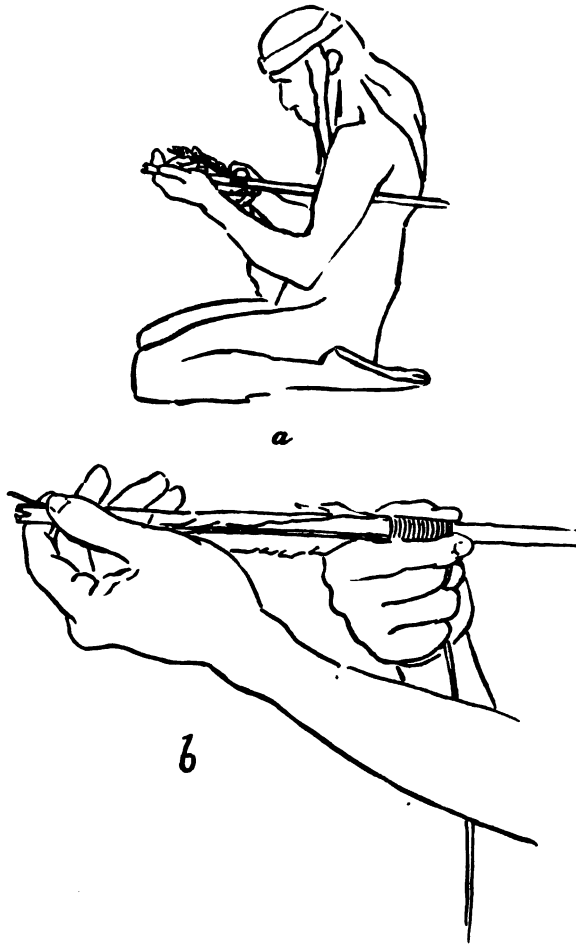


FIG. 12 a b. — Feathering and seizing; a, position in holding; b, of fingers in twirling and binding.

ively, of the south and west. The top- and mid-most shaft was reserved as a personal arrow for special treatment, and the doubtful shafts were left unfinished. At last, in correspondence to the

kinds of shafts as indicated by the cock feathers, the points were selected, the keenest and deadliest for the north and the west, the broadest and shortest for the south and the east. The tips of the shafts were notched and rasped, each with the base of the point designed for it; and the points were then seized on free-handedly with sinew, as I have described heretofore. All these increasingly solemn operations were concluded by the orderly ribbanding of the shaftments with the colors of death and blood—black and red,—or with the yellow of magic, or the green or blue, of life and victory.

The arrows were finally laid out to the west or the east and breath-endowed with lives of their own; then placed with their parent, the fire arrow* (all save its consort, the personal one), in their quiver, heads downward, feathers upward, that the lightning run not out nor the feathers speak before their time, but sleep till wakened for war council and "feeding" or medication.

I find evidence that the Cliff-dwellers followed much these same methods, save that the fore-shafts were made differently, and the order of proceedings, as evidenced dingily by traces on these old-time shafts, inspected in old-time mood, was accordingly different.

The fore-shafts were, for instance, tapered and rounded, chamfered, and the shoulders cut on them all by twirling (either with the fingers or with the hand on the thigh) between gritty stones (Fig. 13)—as early a kind of lathe-work as I have learned of, this! Moreover, before the cane-shafts were grouped to the



FIG. 13.—Turning or chamfering of fore-shaft.

* This was not always an arrow, properly, but a shaft carried ever ready for use as a fire-stick or drill, in the quiver. It was usually, however, made from a well-tried arrow, and was called fire-reed or arrow, by the Zuni. I am assured by that distinguished Arabic scholar, Dr Talcott Williams, of Philadelphia, that such must have formerly been the practice of the Arabs, for he finds that their terms for arrow and fire-stick are likewise similar.

four quarters and the points chosen for them, the tips were fastened to the fore-shafts, as belonging to them,—being their shanks. This and many other interesting, highly significant details, I have made out; how, I cannot pause to relate. but with Zūñi lore and language, as well as reason, on my side.

Nor is there time for analyzing all of these customs and explaining how many of them are survivals of originations so practical and simple withal that they must have been measurably similar and universal in given conditions of culture-growth; but it may be well for me to explain that, being survivals of ages and successions of experience, we must eliminate one after another, the more elaborate of them as we think backward in time; that we must do the same with the working processes I have been earlier describing also; and if you will bear with me during a few moments more of detailing, I will try thus to lay bare not all the stages in stone-working and arrow development, but what seem to me to have been their primal beginnings.

VII

ORIGIN OF EARLY ART AND OF LANCE-FORM TOOLS

In a series of lectures given last spring at the Drexel Institute of Philadelphia, and in other papers, I have brought forward some of the many reasons which have induced me to suppose that man began his art development—his really manual and therefore mental and human development—on the coast of the sea of some tropical or temperate Old-world land. I cannot enter into the matter here much farther than to state that this human ancestor could not well have developed the habit of erect walking until forced from his earliest arboreal habitat and compelled to fend for life with his own hands, and thus taught to use them more for seizing and doing than for climbing and merely clutching, and thus also taught by his hands to devise, and with them to devise purposefully.

Now, in this period of transition from forest to open, from a condition all but as artless as that of the higher tree-dwelling *Quadrumana* to a condition demanding rudimentary art at least, man could not have subsisted, it seems to me, in any other environment away from his fruit-giving trees, than near to the food-

teeming sea, which, in dry season and wet, in cold and in warmth, ever abounded in easily taken creatures and things edible. The universal craving or liking man has for salt—especially with his meat food—would seem to point to some such profound and primal experience-period of the race as that. The well-nigh universal association of the sea-shell with fire ceremonials, would indicate that thus, too, on the coast of the sea he first learned to fear fire little enough to capture and keep or carry in shells, its seed or young; to loose and feed them, for protection at night, and from cold, and thus also to use them—the all-devourers—for half eating for him, food else too tough, too cold, or otherwise too hurtful for his eating. And, finally, the universal distribution of our kind coastwise, it would seem, the whole world over, ere ever language even had been developed vocally from hand usage and gesticulation far enough to remain steadfast or undifferentiated structurally in every great continental area, would also, along with much evidence of the arts, not least of them the arrow arts, still more strongly evidence the same sort of thing.

We can readily enough conceive that it was on the old ocean shore man learned to crack food things—shell-fish and bones—against the convenient stones of the beach; then to crack them with stones, and thus to crack stones against other stones in order to make them in turn crack these food-things the better, and at last to crack such cracking-stones with other stones, wherein he became a tool-making creature—that is, used tools with which to make other tools or with which to imitate and better mere use-made tools; and this was, and here ended, his *true* paleolithic period.

It was there, too, in the soft sand or mud of the seashore, that we most naturally think he learned to dig (for shell-fish and the like) with sticks, wearing them sharp thereby, and thus learning also to wear them sharp intentionally, in order to make them sharp; and from prodding the sand away from his food, it was but a step for him to prod his fellows—or anything else that stood in the way of his food—and thus-wise would begin the development of the pike, the lance, and the spear; the harpoon, the dart, and the arrow. The seeming likelihood of all this would lead me to linger yet a little longer by the seashore with my earliest man. Moreover, I think I can thus explain better

than otherwise quite other things about the arrow than merely its beginning, and can perhaps make it evident that I am not so fanciful as would seem, in this speculation.

First, as to the stages of tool and weapon making, there are three examples of the way in which awkward-handed, experienceless-minded beings began making (or, rather, using) things as tools. They are to be found in the acts of monkeys, imbeciles, or very young children. I have watched and experimented with all three studiously and long. If they would break a thing, they cannot—or at least they never do—dissociate the thing to be broken from the breaking of it. They hit it against something bigger. My friend, Thomas Eakins, the scientist-artist, of Philadelphia, has a pet monkey named Bobby. As Mr Eakins is honoring me by painting my portrait, I have had opportunities for observing Bobby. Now, if you give Bobby a large, hard nut that teeth will not crack, he instantly looks about for a stone or other hard object (he one day chose—literally hit upon—my head) and proceeds to maul the nut against it until broken. Although his master has surrounded him with convenient stones and sticks, he never uses them against the nut, but ever the nut against them, and if his curiosity be aroused as to any one of the nut-like stones, he hammers belike this stone against another, until it—not the stone he hammers—is broken, or if accidentally he breaks the stone he is hammering upon, he gains no lesson therefrom, but promptly seeks another stone on which to hammer the one he would break.

Very little children, if untaught or non-observant, do things in this way, and as far developed as the Tasmanians were above this stage of art, they still practiced edging their hard pebble-choppers (Fig. 14) by seizing them with both hands—the more accurately to direct them—and whacking them until chipped sharp obliquely against other stones, and in this they were, but a few generations ago, in the true paleolithic period of their development.

There are also three contemporary examples of the early use of a prod as a weapon—of at least the chase. These are: Bobby again, young children, and (I say it not gracelessly) women trying to drive chickens or cattle or other frightful creatures. Bobby hates a certain too curious cat, and is not sufficiently scared by her to fear showing fight whenever she appears.

If the cat happens to steal near, but keeps beyond the reach of his tether, he does not throw a stone at her; but he has a long stick with which he hauls things toward him when put beyond his reach and with which he scratches them up when they are buried nearby. While it never occurs to him that he can reach the cat with a stone by hurling it at her, yet he tries to reach her with the stick by lunging it at her. He has thus learned that if he cannot punch her in this way, nevertheless he can hit her, and educe the desired and delightful squall by lungingly hurling it at her, and he does this now with increasing skill and frequency; never by actually throwing it, but by lunging it forward with both hands, and as much with the body as with the hands and arms. If you ever see awkward women or children



FIG. 14.—Outline and section of Tasmanian chopper-pebble.

after anything with a "sharp stick" you will observe that they throw it, if they cannot catch up, in much the same fashion—lungingly, not overhand, as a spear should be thrown, for that would discontinue the initial movement.

And now, I will trace the arrow up from this lowly and slow-paced infancy, to his manhood and marriage with the home-staying bow, for whom he has ever since so swiftly obeyed and run errands.

VIII

DEVELOPMENT OF ARROW-FORM MISSILES

From such breaking of shells, stones, and bones such as I have characterized, and much cutting of his fingers thereby, primal man must have learned speedily enough to do all sorts of cutting, scraping, and scratching with the sharp fragments thus produced. For long, however, he probably used these fragments unmounted, grasping them, perchance, with wads of seaweed or grass, or, when large, winding or clasping them in wisps of fiber or rolls of integument for holding, as I have grasped the stone

here exhibited (Fig. 15), with a fold or two of buckskin, in making with it the shaft-polishers and other like tools I have needed to use in my recent experiments for these demonstrations.

But by lodging such blades in wood or often wedging sharp things into the end of his pike-form digging stick, he must have learned in time that the stick, so long as thus armed, dug better (and cut his contestants or his prey better, too) than ever merely

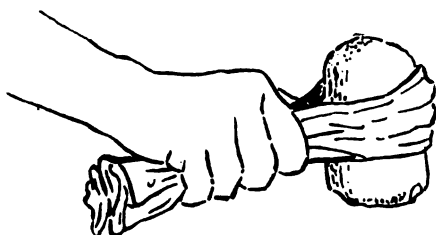


FIG. 15.—Makeshift haft of hammerstone.

with its wooden tip, no matter how well seasoned by heat or favored by long-trying use this was. Then he tied or otherwise attached suitable chips to his digger, which he may have sharpened in the old way—at the other end (Fig. 16)—as the Tas-

manians used to, but which we may imagine he now shortened—having more of use for its peaceful than for its offensive purposes*—until, at need for the capture or the fight, he got a reed from the seaside rivers or marshes, straight and long and light enough to punch withal or fling, if it but had a point, and

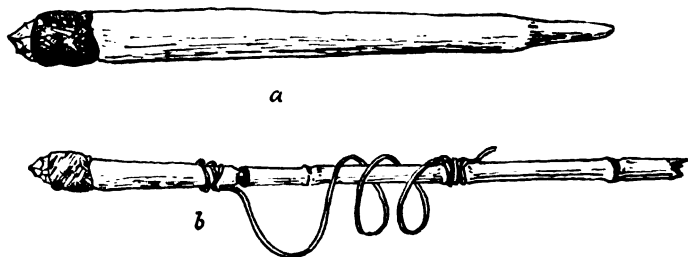


FIG. 16.—a, Tasmanian knife-pointed digging stick; b, mounted in reed shaft as spear.

mounted his stone-bladed picker in one of its hollow ends, thus again lengthening it, at will. Lo! the fore-shafted spear, twin-changeling of the shaft-handled dirk and knife! Thus was born, with many another first form of the things we use, the ancestor

*The digging-sticks of the Australian women (of the interior) were, unless tipped with stone, often six or seven feet long, and were used not only as implements, but also as weapons, either as quarter-staffs, sidewise; or as pikes or headless lances, endwise.

alike of the retrieving arrow and of our familiar pocket companion—pencil and wit-sharpener of those who write—long before man was weaned from the skirts of his Gray Old Nurse, the sea—born there, in time to drift with him, ere yet he left her side, over the whole shore-land world.

We have but to note the long and tapering forms of prehistoric stone knife-harpoon heads everywhere pointed—not quite usefully otherwise than as survivals of an early use—to believe in this thought as not improbable. Then, too, we may note the unearthed knives and harpoon-heads of the early coast- and island-dwellers of California, or of the ancient fisher-folk of Peru and Chili (Fig. 17), to see that each is so like the other as to puzzle

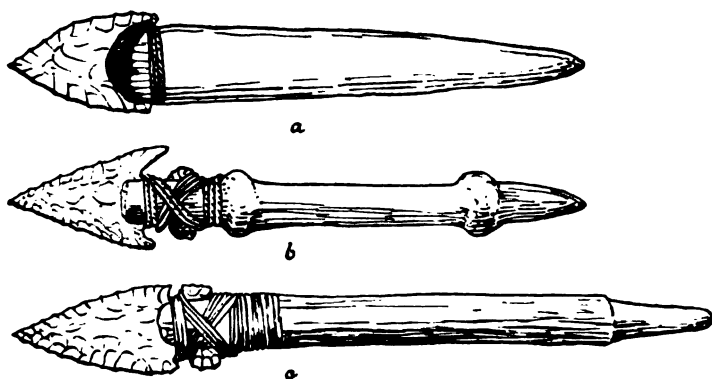


FIG. 17.—Knife-harpoon heads; *a*, California; *b*, Peru; *c*, Cliff-dweller.

the sharpest observer. The handle of each, though preserving its ridges at either end, alike useful for grip-guard or reed-shoulder or tying (*b*), may not denote that each was used at so late a time indifferently for either purpose, but it seems to say that its ancestor was so used for very long. When, some time early, man found that the slim-handle knife, getting loose in the shaft of his spear, pulled out with the fish he had struck, but that if tied with a long enough string held its prey quite as well as the whole spear when held by a string in his hand, he had but to transfer his retrieving line, which always had hindered the fling, from hand-hold to mid of the shaft, and from thence to the hilt of the head, to have formed a perfect harpoon. (Fig. 18.)

Imagine how men in those old days thought of the sharp-

beaked shafts they cast at fishes and water fowl! They must have longed every day to emulate the osprey and the fish-hawk! But although they made their harpoons hook-beaked with barbs (or had made them so already) and claw-headed with recurved bone prongs, yet their flights of them were none the better for all that! Then why not tie hawk feather or eagle plume to the body

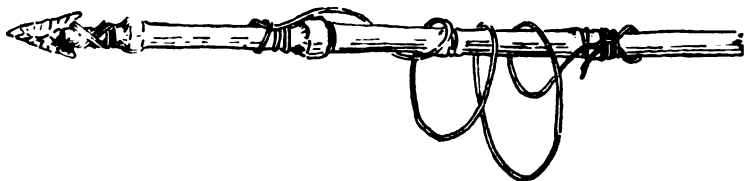


FIG. 18.—Knife-headed harpoon.

of the missile? How such feathers flew and flew, whether with the bird they belonged to, or when dropped in the wind! Forthwith, you may be sure, they tied wing feathers to their shafts, two at first, midway; but lower down after awhile, and with a third feather, the "tail," for the smaller shafts, to keep them straight and headwise. Primitive man never, until after the time of Homer, got over this believing (as his kind believe today), that the flying quality of the feather and of the bird it came from gave light swiftness and sharp sureness to his bird-bolts, not the feathering in itself.

IX

ORIGIN OF THE DART-FLINGER AND BOW

Using spears and harpoons with irregular poles, or shafts of jointed cane, man found a mighty advantage in those which had



FIG. 19.—Shaft-girdle and clutching-knob.

knobs or joints large enough to afford sure grasp to the hand in throwing, especially men of the water side, where their things were so often wet and

slippery; and still greater advantage they gained from this experience later, when with plaited girdles or bands of other sort

they enlarged these joints at the grasping point or bound to the shafts, knobs or catches, of ever better and better device for the special work in hand (Fig. 19). They found, too, that for

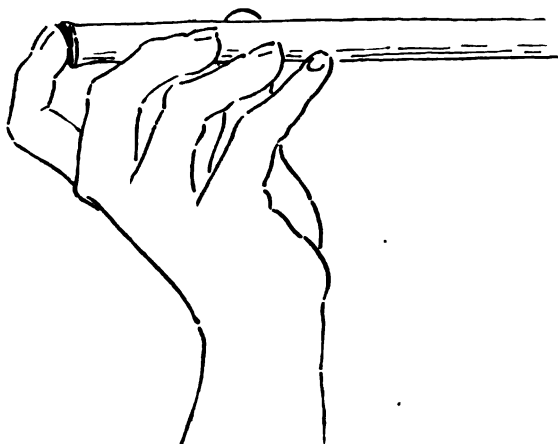


FIG. 20.—Finger-throw.

far throwing and small quarry the light javelin was best, and that he who had the longest arm could hurl it the farthest; he who had the strongest fingers and could launch his missiles with one or another of them used as a lever behind, like a hook

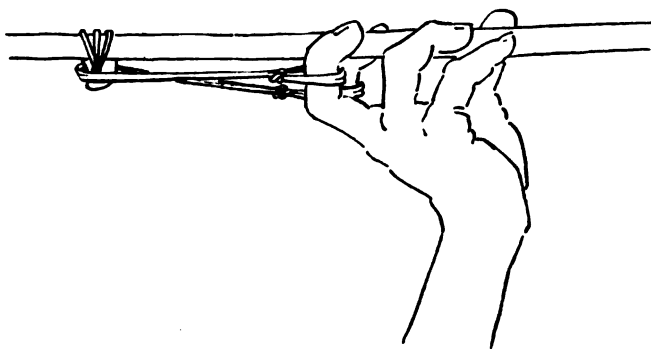
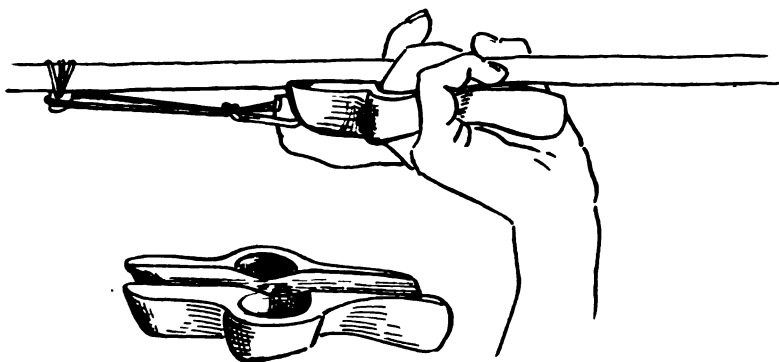


FIG. 21.—Spear-noose or slinging strap throw.

against or inside of its hollow butt (Fig. 20), was surest of aim and sharpest of stroke.

So presently they began to fit the shafts with straps or their fingers with slinging-nooses (Fig. 21) to farther the flight. From

the soreness which came of much or constant use of such first appliances (I have tried them and know), it was needful to make them ever better and better, until the loops became rings for the fingers, more rigid, and joined together; and these, in turn, became palms of rawhide for the throwing-hands, or of wood hollowed straightly and fitted with holes at the sides for the thumb and great finger, and with a groove underneath extending to the rear end, at which was a notch or a hole for this finger when stretched back along the groove and thrust up through the hole or over the notch to hold the noose of the sling-strap (Fig. 22) or press against the shaft-butt, so as to project with force the spear when, if long, it was thrown with both hands.



FIGS. 22, 23.—Spear-palm and sling strap.

Of such early devices as these spear-palms or graspers, so to call them, I have happily been able to find two historical examples, and doubt not others will yet be found. One of these, although a true spear-thrower, is quite such a palm as I have described, save only that it is a little too long and is furnished with a rude catch of bone in place, as it were, of the fore-finger-nail. It was rescued from the Santa Barbara Indians, ere they became extinct, by that great voyager Vancouver.* There was found, too, some years ago, another of these things, even more archaic, a veritable spear-palm, such as I have described, but

* This specimen has been described in the *Journal of the Anthropological Institute of Great Britain*, vol. xxi, London, 1891, by Mr Charles H. Reed, of the British Museum; and both rediscovered and figured by Professor Mason in his little paper on "Throwing-sticks from Mexico and California," published in the proceedings of the National Museum, vol. xvi, No. 932.

beautifully inlaid with bits of *haliotis* shell. I saw it in a collection of remains from the islands of the same region, but did not know, and no one at the time knew, what it was. I have now, however, identified it and reproduced a plain one like it (Fig. 23) and used it successfully. Perhaps the most interesting historic relics showing survival, I believe, of such uses of the spear-palm device as are here referred to are to be found in collections of Etruscan and early Roman remains.

At the Washington meeting of this Association, as may be remembered by some, my friend, that brilliant and many-sided naturalist, Professor Edward S. Morse (who did more for the study of "arrows" as a subject than any one previously, in his

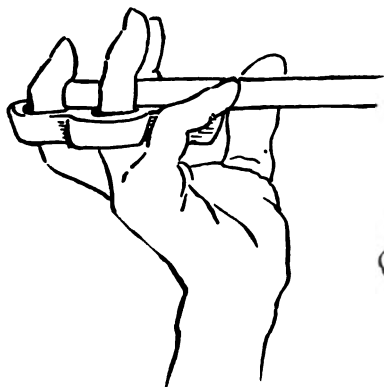


FIG. 24.—Finger position in spear-palm clutch.

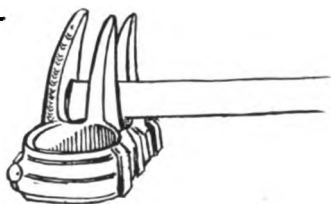


FIG. 25.—Etruscan "bow-stretcher;" probably spear-clutch.

striking and oft-quoted work on "Arrow Release"), held up before our section and discussed some of these remarkable little bronze relics, telling us that they were called "bow-stretchers" or "bow-stringers," ordinarily, in European museums; that, however, antiquarians were not satisfied, nor was he, that they were such, and that all sorts of opinions, equally inconclusive, had been advanced as to their possible use. He then, seeing me, handed the specimen to me, remarking very kindly that "if any one could make out their meaning, Cushing could." Although then I was dubious, today I am grateful for both the compliment and the opportunity; for, comparing this old Etruscan relic with such a double spear-ring or clutch or such a spear-palm as I have described (Figs. 24, 25), one sees that the spikes or prongs

on it so resemble the fingers when thrust up through the holes of a spear-palm like the Santa Barbara restoration, that they seem to have been made to replace them, as if to receive a spike at the butt of the spear, and thus enable the warrior to reserve the strength of his whole grasping hand for gripping and bracing the spear in close work or in projecting it far and with force when he would hurl it at the breast of the foe (Fig. 26). With this in mind, one sees, too, on re-examining the specimen, how the rings fit the fingers exactly for such use, and how they, and the prongs also, show wear only inside, where they should be worn if used as I have supposed. Finally, in the ornaments of

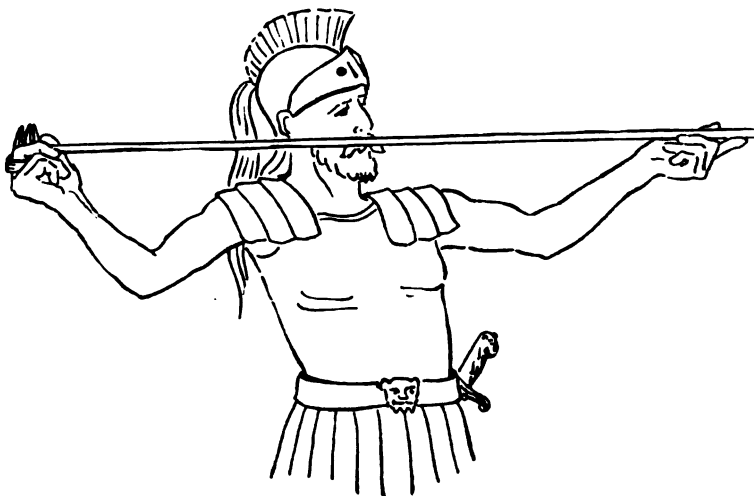


FIG. 26.—Spear-clutch throw.

the particular specimens I have examined, one can see plain survival of the double-bent bands, the knotted fastenings of rawhide, and the prongs, of horn or bone, with which like spear-clutchers might have been made long before the age of bronze.*

* Discussing this and my succeeding paper at the recent meeting of the American Association for the Advancement of Science, in Springfield, Professor Morse questioned the soundness of my theory regarding the primal use of these so-called "bow stringers" or "stretchers." Referring to the great number of such relics which he had examined and sketched, he called attention to the fact that on some of them the prongs were replaced by mere knobs or protuberances. He further argued that such use as I assigned for them, although so important, was nowhere mentioned in classical writings.

In replying, I stated that even this later or bronze form of the objects in question was in the two specimens I had examined so perfectly adapted to the fingers for use in

Yet these early kinds of spear-palms and clutchers, while giving secure grasp and great power in the holding or hurling of heavy weapons, did not greatly increase the distance of their flight. So long as they only were known, there still remained the superiority of the long-armed thrower. But let us suppose that

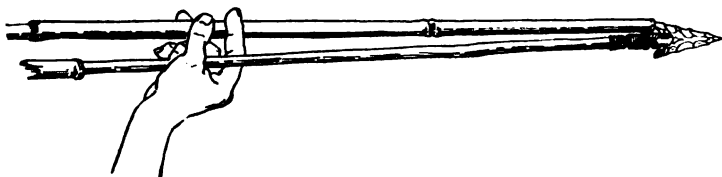


FIG. 27.—Throwing with spear.

a man holding an extra spear in the hand (point backward) with which he hurled another, happened now and then to catch the butt of the one thrown on the barb of the one held (Fig. 27), he would not fail to find that this gave great additional force to his cast. I conceive that it was thus, or in some like simple



FIG. 28.—Throwing with throw-spear.

way, that it was found expedient to lengthen out, backwardly, the rear- or finger-end of the spear-palm, if the spear-palm had come into vogue before that, and if not, to make an imitation

powerfully clutching and casting, say, a spear, that I was inclined still to believe even the knobbed examples he graphically sketched for us could well have served such purpose, or may at least have outlived such use originally in somewhat analogous uses. I would add also that while classical writers do not, indeed, expressly mention, so far as I know, the use of these bronze articles at all, nevertheless some of them, notably Xenophon in his *Anabasis*, do incidentally refer to straps and other devices for flinging spears, in connection with which these pronged and knobbed rings would have served admirably.

Be all this as it may, the general argument of the paper is not materially affected by this single illustration in it. I acknowledge that the small number of specimens I have studied, though typical, hardly afford basis for more than a suggestion as to their use or derivation, and I am grateful to Professor Morse, therefore, for his words of caution.

throwing-spear, so to call it—a mere spindle or flattened shaft with a barb or hook at the end of it, like, for example, the throwing-sticks of the Australians (Fig. 28). The spear-throwers of the Eskimo (Fig. 29), so instructively classified and described by Professor Mason in his paper on "Throwing-sticks in the National Museum" (Report of the Smithsonian Institution, 1883), are regarded as the most highly developed forms of that apparatus in the world. They certainly are the most elaborate; beautifully shaped to fit exactly the grasp of the throwing hand, and are provided with effective shaft-grooves and butt spurs or catches of ivory or bone. But there are some peculiarities of these throwing-sticks which relate them apparently to an undeveloped form,—quite directly to spear-palms somewhat like those of Santa Barbara and their greatly lengthened out descendant, such as is figured and described by Professor Mason (*op. cit.*) as having been found in use and collected near Lake Patzcuaro, Mexico, by our well-known, scholarly, and indefatigable writer on anthropology, my friend, Captain John G. Bourke, of the United States Army.

On examining any typical collection of Northwest-coast throwing-sticks, or the illustrations of Professor Mason's paper relative to those of the National Museum, one will be surprised to note how many are marked or grooved down the backs or under sides (Fig. 30). The grooves, thus placed, have no apparent use; were put there, evidently, for some traditional or notional reason. In other words, they would seem to be survivals, for some are mere scratches, and all lead either directly from the finger holes or pits (or else from the side on which these or their substitute clasping notches or pegs occur) to the spur insertion or to beyond, being always painstakingly cut or scratched into or across the base of this hard ivory spur-block.

It is this groove particularly which appears to relate these sticks to one of the earliest forms, the palm-and-finger form (like Fig. 23), for they seem to be survivals of the finger-groove, lengthened out, perhaps, to accommodate the string, which was held noosed to the backwardly bent middle or fore finger and extended to the end of the stick, there to hold the butt of the spear or catch thereof until a bone finger (artificial finger-nail, as it were) was inserted, after which, as was fit in savage use, the groove was kept as a channel from the finger end to this extra end or nail. as a

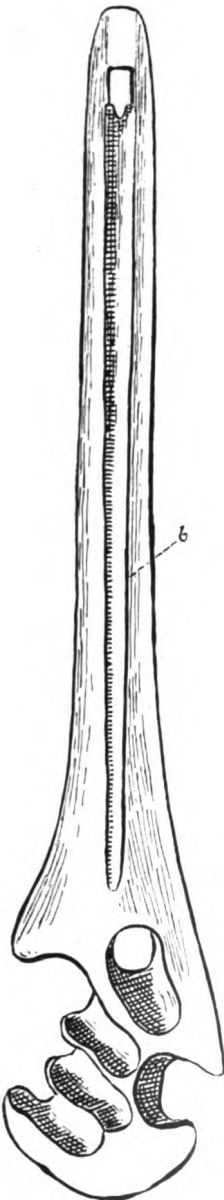


FIG. 29.—Front of Eskimo spear-thrower, showing shaft-groove and spur (see also section).

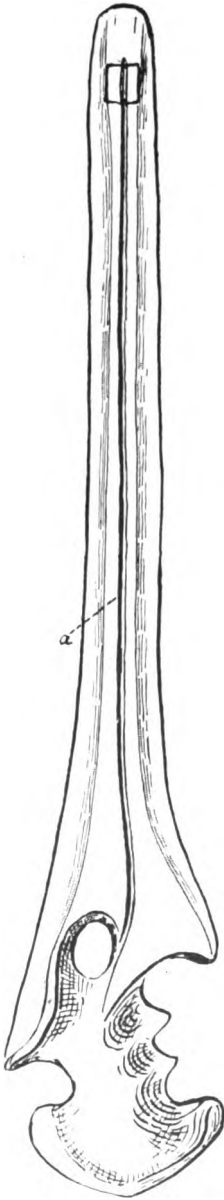


FIG. 30.—Reverse of Eskimo spear-thrower, showing back groove (a in figure and section).

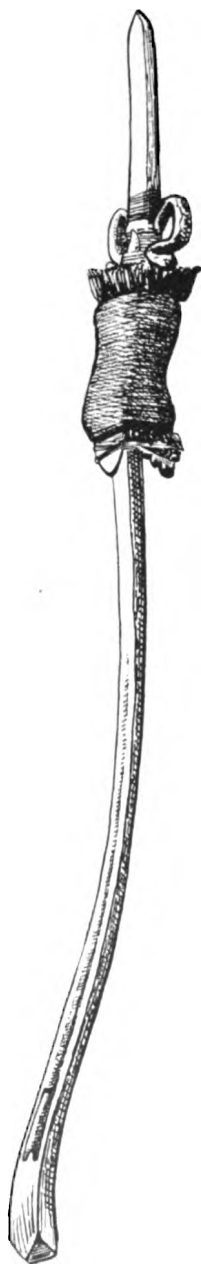


FIG. 31.—Restoration of Cliff-dweller throwing-stick or atlatl.

"way trail," so to say, through which the strength of the forefinger might reach the spear-butt or catch. I would like to refer to some examples of this groove as having probably been transferred in turn even from the throwing-stick to later forms, when these displaced its supremacy in use, as may be seen on certain bow-arms of the northwest region, the bellies of which are quite as uselessly grooved from grip, to horn or nock.

The element next higher in the development of the dart-flinger is not present, however, to any great extent, in the Eskimo forms, but it is to be found very decidedly exemplified in the throwing-slat or atlatl, quite independently identified by Professor Mason and myself in the remarkable Cliff-dweller collection I have before referred to.

Through the courtesy of my friend Mr Stewart Culin, Director of the Archeological Department of the University of Pennsylvania, I have been enabled to study out experimentally the original form of this interesting flinging-slat or -stick, and to reproduce it in its original condition, accurately and in working form. This little apparatus (Fig. 31) is made from a very slender and flexible sapling, of light and springy but hard wood, such as the Cliff-dweller bows were made of, the half or one arm of the more finished sort of which it almost exactly resembles—that is, the small handle is straight or slightly up-turned from the ingeniously attached, spectacle-like finger loops or rings of hide, and thence toward the spur end it curves first downward, then rather sharply upward to the groove, which is short and shallow, and to the terminal spur-sink,

which is only an inch or two long and is relatively deep. Thence to the end, a couple of inches more, the stick is curved down again so as to throw up the spur or catch and the little groove at the end of which it is cut; and thus the whole in profile and upside down resembles the arm of a Cupid's bow, save that the end or "horn" is thick.

Just above the handle and finger-loops is a heavy binding, first of sinew, then of yucca fiber, lastly of brown yarn, which at the outer end firmly seizes to the rounded (or under and back) side of the implement a fragment of beautiful black slag or limonite—the blood-clot of giants slain in Creation time with lightning of the gods of war, according to Zuñi lore. On the opposite or flat,

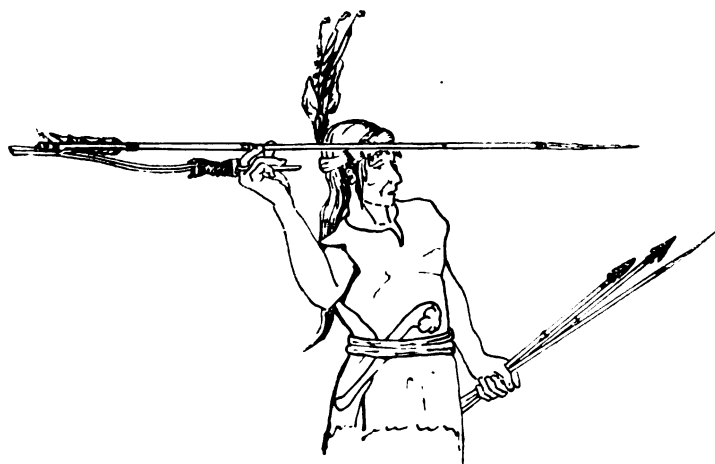


FIG. 32.—Cliff-dweller atlatl or throwing-stick in use.

upper, and front side, also at the outer end of the bindings or packings, a beautifully ground and polished chalcedony knife-blade (the tip only of which protrudes) is bound on and probably served to divide the feathers, or as the "father of lightning" (to increase which it was doubtless ground at night), precisely as the lightning knives of the Zuñis are on their badges of war. Finally a little tusk of the wildcat is inserted into the packing on the same side, its protuberant point laid close against the finger loop, strap, or fastening, so as to hold it from slipping. I find that originally feather-work was whipped into the surface of the packing near either end—of red, yellow, and blue

plumage, probably taken from the jay and the red-headed woodpecker of the south or from humming-birds. All this was both fetishistic (the life portion of the flinger) and to brace the knuckles so that the spear could be easily held high when flung. Thus the shaft of the dart did not lie along the upper face, as in other and long-grooved examples, but merely touched the counter-sink near the spur or catch at its end. As the result of this method

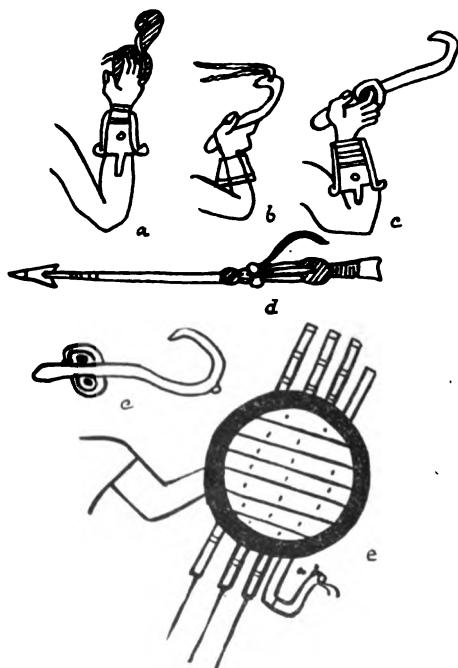


FIG. 33.—a, Maya representation of crozier-form atlatl held close, with strap, for throw; b, ditto, released, straps flying (Dresden Codex); c, c, Maya and Mexican crozier-shaped throwing-sticks; d, Maya spear with holding strap; e, ancient Peruvian sheaf of darts, shield, and symbolic throwing-crook (from Chimu vase painting).

of release and of the curved and flexible style of the flinging-stick, the spear or dart could be sped with a spring, which added so greatly to its force that with my reproduction of the cliff specimen I can throw the harpoon twice as far (Fig. 32) as with my Eskimo specimen, with less trajectory and hence more accurately. .

Among a people armed with such effective flingers, I do not wonder that their use survived that of the bow, even away from the appropriate habitat of the spear-thrower—the water side; nor need one wonder that the famous atlatl of the ancient Mexicans,

made famous anew by the amazingly convincing and beautiful study of it Mrs Zelia Nutall has given us in the first volume of the Archeological and Ethnological Papers of the Peabody Museum (Harvard University, 1891), and which atlatl is, I believe, the lineal descendant of this one of the Cliff-dwellers, feather-work, fetishistic element, and all; nor that it should also

have been even more highly valued for special purposes by the Aztecs than was the bow, for in its many southern forms, as figured by Mrs Nutall, are to be found still higher developments. I refer especially to the crozier-shape ones and to those "with straps" (Fig. 33, *a, b*), recalling Fray Diego de Landa's most significant description of the Maya forms seen by him in the sixteenth century.

Now, the crozier-shape or bent form of the spear-flinger (Fig. 33, *cc, e*) was, as my experiments have indicated, a veritable combination of the bow and the spear-thrower. In it the spring of

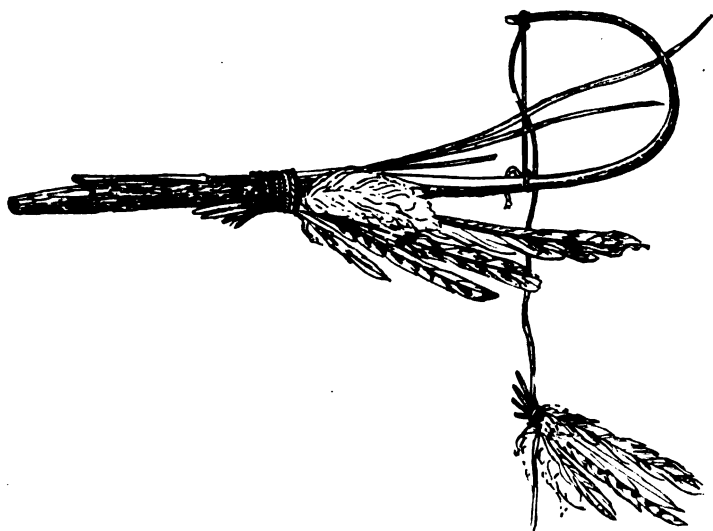


FIG. 34.—Zuñi plumed prayer-stick of war sacrifice, or "Bearer of the reed of war."

the bow already appears. It is simply a stringless bow, used backward, while in the still more elaborated form of it, that of the Mayas, the string also appears, only it was loose at one end (Fig. 33, *a, b*) or else attached to the spear-shaft itself (Fig. 33, *d*), as shown by the plates in the Dresden Codex (which has opportunely been sent me within the last two weeks by that generous patron of anthropologic research, M. le Duc Loubat). Were I uncertain of the meaning of these forms I might be reassured by certain evidences furnished by the Zuñi. The Zuñi still have traditional knowledge of the use of the spear-thrower and its appropriate hoop or net shield by their cliff-dwelling ancestry ;

and the truthfulness of their vague traditions is substantiated by certain survivals among them. One of these, as exemplified in certain spear and ring games, I shall refer to in the following part of this paper. The presently significant one is apparent in their little crooked or crozier-shape prayer wands or staffs. Some of these are actual staffs in miniature, and symbolize the prayer journey and a number of other things; but the warrior and hunter symbol and sacrifice of this shape, differs from these in being supplied with a holding string. It consists of a split twig about a foot long, the upper end of which is bent far over, like the head of a shepherd's crook (Fig. 34), and tied at right angles to the main part of the shaft with a taut string, on the middle of which is a double knot or a dab or two of black paint.

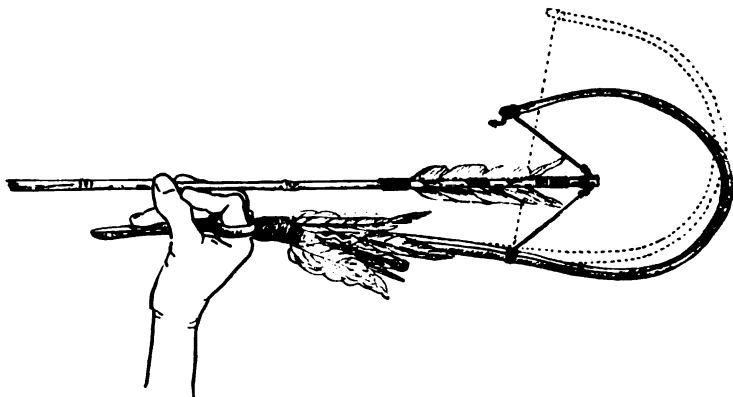


FIG. 35 — Restoration of ancient stringed spear-crook or throwing-bow (from Zuhri prayer-stick of war).

It is plumed on the handle portion or near the base, and attached to it inside, so as to lie along it and against the string at the "knot" or paint dab, is a sprout or stem of cane or reed-grass. If this little "carrier of the cane" or "war-staff" be but enlarged or restored (as I have experimentally restored it) and used with a notched spear-dart like those of the Dresden Codex, with or without straps, and if then the missile be pressed back against the string and held with fingers (or by its strap) until released with a fling, the rebound of the string, as well as the spring of the flinging-staff, adds treble velocity to it. And it seems to me that the steps are few and short from this already strung but reversed flinging-bow (Fig. 35) to the bow of archery.

That such steps were actually taken, not in one land and by one people alone, but in many lands and by many peoples (and from differing forms and styles of throwers to differing developments of the bow), can, I think, already be shown. In the first place, the Zufi name for the bow is significant. It is *pi'*-*'hlan-ne*, from *pi'*, "a string" or "stringed" (emphatic form); *'hlan*, "a slat," "stave," or "staff," and *a'-ne*, "to go," or *a'n-a-ne*, "go-thing"—that is, "a stringed go-staff" or "stringed go-slat." "To

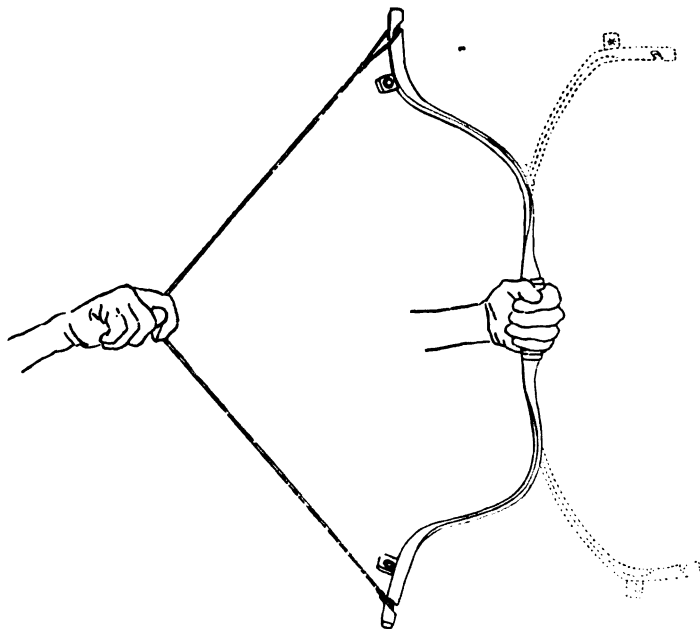


FIG. 36.—The "Tartar bow," as drawn, released, and reversed when braced with slack string.

shoot" (with an arrow) or "to hunt" is *'hala'-ta*—that is, "slat-direct" or "staff-aim"—whereas the name for an arrow is *sho'-o-le* ("cane" or "reed"), and is not, it will be seen, referred to in this etymology. Again, to hit or pierce with an arrow is *'hlat-k'u*, from *'hla'm*, "a staff" or "slat," and *t'e-k'u*, "to stick into"—that is, "to slat-stick" or "slat pierce," in the sense of piercing or sticking into from or by means of, not with, the slat. Now, all these terms, especially the latter two, were formulated, I take it, from use of the throwing- or flinging-staff, not from use of the bow in its

later form; and they would indicate that with the Zúñi ancestry, at least, the throwing-stick both antedated and gave rise to their later present form of bow. Of this there is far more additional evidence than I can offer here. Nor can I enter into the intensely interesting results of my experiment study of Mexican and Mayan forms of the throwing-stick, all indicating even more strongly the same thing, and indicating also the directness of derivation from

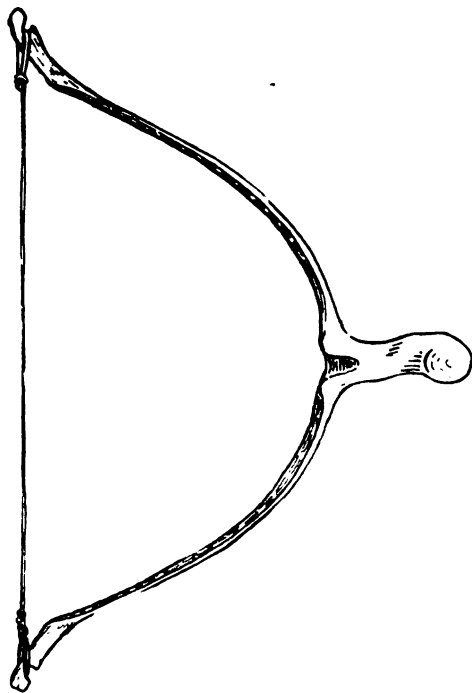


FIG. 37.—Primitive crotch-bow, wide antlers.

our own great southwest, of art elements, at least, in these old cultures of the south. I must, on the contrary, turn a few moments to other lands.

In old world countries, language tells much the same story in, for example, Chinese and Korean terms and characters, according to Mr Culin's profound studies of these peoples and their languages, and in the Arabic,—of which that brilliant and universal scholar, Dr Talcott Williams, tells me archery terms are apparently quite as dissociated in derivation

from an original use of the bow with the arrow as are those I have above analyzed.

When talking on this subject with my lamented friend, the artist, Thomas Hovenden, who went to his noble and heroic death but a few days ago, he did not at first understand and quite believe in my theory, but pushed a canvas toward me, and handing me a charcoal stick, bade me draw the form of thrower I then thought was the connecting link between flinger and bow. I

drew one—a long, slender twig, with a fork at the end, and a string attached to the crotch, both for catching the spear and for bending the stick to give it spring when loosed. He looked astounded for a moment, then delighted. “Do you know,” said he, “that as a boy I played with such a sling-stick as that, as other boys commonly did when bird hunting on the Irish marshes;” and in the morning he made me one. It was my hypothetical connecting link between spear-flinger and bow.

Dr Williams informs me also that when he was a boy the young Indians of central New York used some such apparatus, half

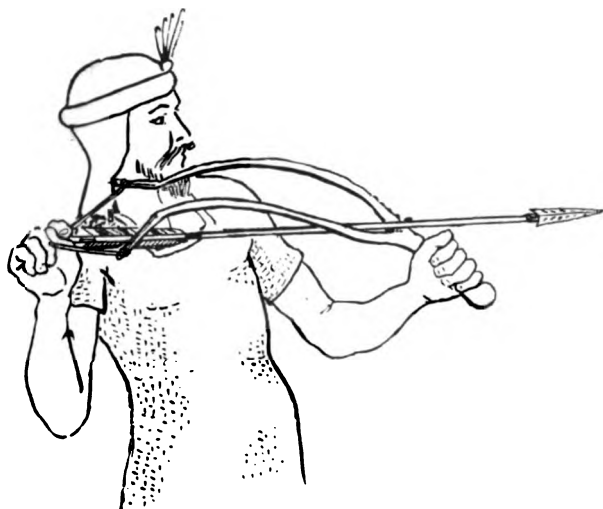


FIG. 38.—Mode of bracing and releasing bow-crotch.

toy, half weapon, and that his father once made one for him. You are all familiar with the dart-springing stick, which is stuck in the ground and while held by one hand is pulled back by the other to fling the dart. Certainly every one is acquainted with the “slap-jack,” destroyer of so many window-panes in school-rooms and on city streets. You approvingly remember also, I hope, what I have said on an earlier page, of toys; but I wish to explain for a moment the development of a throwing-crotch resembling these things, in a part of the world where its study serves to ex-

plain more than merely the origin of its appropriate form of the bow. I refer to the vast area of the so-called "Scythian" or "Tartar bow." Any one who examines one of these extraordinary bows, and especially who notes the manner of its use, will not find much difficulty, it seems to me, in tracing it back to what appears to have been its ancestral form in a simple forked twig or flinging-crotch, the steps are so obvious and few.

The Tartar bow (Fig. 36) is a built-up bow, excessively flexed, not toward the belly, as are bows usually, but toward the back, its ends or horns being still more backwardly flexed, so that they even approach each other when the bow is slacked. The string-nocks are deep and slanting, and at the base of each horn or ear is attached, on the belly side, a bone or other hard block, chiefly to catch or slip the string when rebounding, but pierced trans-

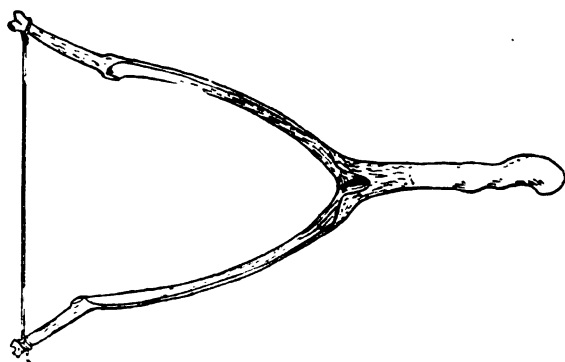


FIG. 39.—Primitive bow-crotch, narrow antlers.

versely in some specimens. Through these blocks the ends of the string used sometimes to be passed from one side before being noosed to the nocks or else it was knotted one-sidedly to the nock of the upper arm. Thus when the bow was drawn, not only were the arms reflexed more than twice as far by a pull of but the same distance to the rear of the grip or bow-hand than they would be on the ordinary bow, but the string pulled more to one side than the other, so that the curious overhand release sometimes observed among Tartar, and, I am told, some other Mongolian tribes, was not only facilitated, but in these cases was rendered inevitable. Thus an arrow was half shot, half flung, or

cast from such a bow, and it is this which makes the thumb-ring pull and the overhand release natural and which challenges our attention; for the motion of the release (Fig. 36), no less than the form of the bow, seem both to have been directly derived from a wide-antlered, two-hand dart-flinging crotch (Fig. 37)—half slinger, half bow—which probably suggested a still wider-armed, spliced and haftless crotch or bow, and thus almost immediately preceded it in development. With such a crotch, if stringed between the two antlers or branches and grasped in the left hand by the handle at their base or juncture, while with the thumb of the right hand the string was drawn back—the dart meantime being held thereto with the fingers of the same hand and thus braced for release (Fig. 38)—one can see that with a sharp fling the dart would be discharged over the crotch and the string fly over the bow-hand, much as it does in the Tartar bow-release, so to call it. This form in turn is but an improvement on the one less spread and depending on both outward and forward release-spring in its antlers (Fig. 39); and this, finally, is but little better than one in which the spring of its still less separated branches was forward alone, and was its sole advantage over the long-branched and flexible but one-handed throwing-crotch (Fig. 40, *a*), recalling in some ways the unrelated Celtic form my friend Hovenden made, and the primal short-branched sling-crotch (Fig. 40, *b*) in which it would seem was the germ of this peculiar sort of built-up and compound ancestor of the Mongolian bow.

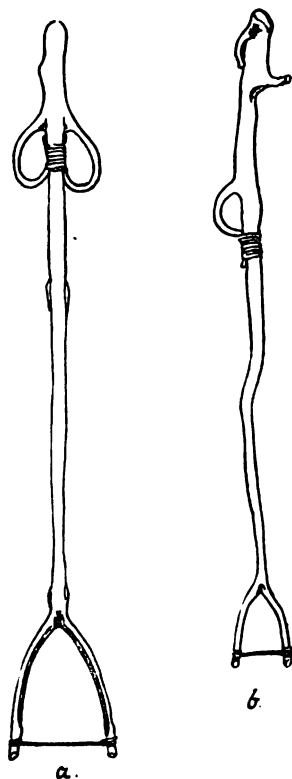


FIG. 40.—Dart-finger crotches; *a*, developed form; *b*, early form.

[TO BE CONTINUED]

THE BEGINNING OF AGRICULTURE

BY W J MCGEE

The following pages record a few observations and generalizations made incidentally in the course of an expedition through the little-known region in Arizona and Sonora (Mexico) called by Spanish-Americans "Papagueria," or land of the Papago Indians. The primary purpose of the expedition, which was made under the auspices of the Bureau of American Ethnology in conformity with plans of the Secretary of the Smithsonian Institution, was the making of a collection representing the arts and industries of the Papago Indians. In part the observations recorded herein pertain to subjects concerning which no expert knowledge is claimed; in so far as they relate to plants and animals they are merely such as any intelligent traveler through a region of pronounced peculiarities might be expected to make,* but the observed relations of plants, animals, and men, among each other and to their common environment, were studied with care and generalized with some fullness. Throughout the expedition the question as to the influence of a peculiar environment on mankind, individually and socially, was constantly borne in mind; and it was this question that directed the observations and generalizations. The principal conclusion is in accord with the opinion of Powell and some other students concerning primitive agriculture, but the generalizations and inferences are independent, and the line of induction is new.

CHARACTERISTICS OF THE REGION

Papagueria is an indefinite territorial unit varying with the migrations of a nomadic people, and thus with human whim and seasonal succession. In a general way, it lies south of Gila river in southwestern Arizona, west of the great Sierra Madre of western Mexico, and northeast of the Gulf of California. Its northern

* It is a pleasure to acknowledge obligations to Mr Wm. Dinwiddie, the photographer of the expedition, for excellent photographs of the plant forms referred to, and to Mr F. V. Coville and Dr J. N. Rose for identifying several species therefrom.

and eastern limits were originally fixed by interaction against the Apache and other predatory peoples, or rather by an assemblage of geographic conditions involving the presence of water in sufficient quantity to maintain hunter and robber tribes; the western boundary is the limit of habitability to *the* desert-loving tribe, par excellence, of North America; while on the south the land of the Papago merges into that of the Opata, Nevome, and Yaki or abuts sharply against the domain of the bloody Seri. From the Gila on the north to the rancherias beyond Rio Sonora on the south, Papagueria measures some 400 miles; on the international boundary it is nearly 200 miles broad, narrowing southward; the area in round numbers may be 50,000 square miles.

From the foothills of a massive mountain range the land of the Papago slopes southwestward as an undulating plain with many minor mountain ranges rising sharply from its surface along lines generally parallel with the great Sierra. Streams gather in the Sierra and in the higher embossed ranges, and the larger of them flow in the intermontane valleys northward and southward from a subcontinental divide coinciding closely with the international boundary; but in their middle or lower courses these stronger streams trend southwestward across the valleys and athwart the axes of the minor ranges toward the Gulf of California. The great streams heading in the Sierra Madre—"Mountain Mother [of waters]"—carry vast floods in their middle courses during the rainy seasons, while at ordinary stages they are but slender brooks; and between the Gila-Colorado and the powerful Yaqui (the Indus of Mexico, whose far-reaching affluents with their hundreds of tributaries drain most of the high Sierra) even the freshet waters are absorbed by the dry air and the thirsty soil, and none of the rivers reach down to the sea. The smaller streams are more erratic in direction, but the smaller and the larger are alike in general character; all head in the mountains and, gathering volume from tributaries, flow along or athwart the intermontane valleys for longer or shorter distances, and then dwindle or disappear as the waters evaporate or sink; for a few hours or days after the storms of the rainy seasons all are rushing torrents, and then for days or months they are but slender brooks or broad wastes of sun-parched sands. All the waterways are deep and rugged gorges or gulches—the "barrancas" of the Mexican vernacular—toward the sources,

broad steep-banked and sand-lined arroyos in the upper valleys, and expanded deltaform silt sheets in the lower valleys; and in all permanent streams the midlength arroyo of the upper valley is cut out and maintained by the brimming floods of the rainy seasons despite the feeble sedimentation of the narrow streamlet wandering over the channel bottom during the dry season.

Papagueria, with its western borderland skirting the Gulf of California, is perhaps the most arid region of equal extent on the western hemisphere. The annual precipitation over the portion lying in Arizona, according to the latest charts of the United States Weather Bureau, ranges from about three to something over ten inches, the maximum occurring only in the Sierra Madre on the east; the average west of the Sierra is probably less, and toward the gulf much less, than five inches. On the Sonoran side of the subcontinental divide the rainfall is undoubtedly a little greater, though trustworthy figures are lacking. Within the region the districts of January-February and July-August rains overlap, and there are thus two rainy seasons during each year. To this circumstance many of the characteristics of Papagueria may be ascribed. In the first place it is probable that if the rainfall were concentrated in a single season, the storm freshets would be greater and a part of the scant water supply would escape into the gulf, rendering the region more desert than it is; in the second place the semi-annual watering and checking of evaporation vivifies the flora and doubtless enables many plants that could not survive a ten-month drouth to maintain themselves—certainly the semi-annual rain is a condition to which the vegetal and animal life is adjusted, as shown by the two seasons of leafing and flowering of different forms.*

The higher ranges near the Sierra are thinly clothed with pines, oaks, and their associates; the larger foothills as well as the lesser ranges and the higher portions of the intermontane plains are still more scantily mantled with cactus, yucca, agave, several mimosas, acacia, paloverde, and meager thickets of chaparral; many of the great alluvial aprons which characterize this region of sub-aerial planation are given over to cacti and related plants of many genera and species, with scattered stems of grasses and occasional

* Johannes Walther has shown that the flora of the American deserts is richer than that found in the deserts of the Eastern Hemisphere. *Nat. Geog. Mag.*, vol. iv, 1893, p. 166.

tufts of greasewood and rabbit-brush; the intermontane valleys are sparsely dotted with mesquite and related mimosas, and an occasional paloverde and the creosote bush in season, intervening with vast treeless glades supporting nothing but widely scattered blades of silver grass, or with stretches of greasewood and other prickly shrubs; while the barrancas and the midlength arroyos of permanent streams are flanked by cottonwood, willow, giant mesquites 40 to 75 feet high, sycamore, ash, and other trees, with a rank undergrowth of shrubs, grasses, canes, and vines, all growing in tropical luxuriance. Viewed collectively, the flora is fairly rich in species, wretchedly poor in individuals; by reason of the vegetal extravagancies of cactus, agave, yucca, and aberrant tree-type, the flora is multiform when individuals are viewed, but by reason of a prevailing tendency in the differentiation of distinct types it becomes monotonously uniform when viewed collectively. Leaves are lacking or small and close-folded; stems and trunks are prevailingly gray-green and waxy, and thorns abound on all the floral forms; yet, though many mountains are almost barren and many valleys are nearly bare, vegetation is never totally absent save from a few shifting sand wastes and the coastward malpais—the “bad land” of Mexico.

The animal life is largely nocturnal and crepuscular, and the day traveler sees little of the fauna. The most conspicuous animate creature, by reason of its works and the number of individuals to be seen, is the farmer ant, whose well-kept fields and clean threshing-floors dot the great alluvial aprons and some of the higher intermontane valleys by tens of thousands—indeed, a quarter, if not a third, of Sonoran Papagueria has been reclaimed by these thrifty husbandmen for their own uses, so that a full half of the grass to be seen in a day's journey is that which the farmer ants have, apparently, cultivated and fertilized. In the lower valleys, along with the scattered mesquites, the southwestern ground squirrel abounds; in the annually flooded deltas, as well as along the mountain slopes, the California quail and a variety of smaller birds, with a few of larger size, are found; hawks and, in Sonora, eagles are often seen, while the jackrabbit and coyote are never far away; lizards, bright-colored and somber, are hourly in view; the horned toad is seen now and then; spiders, including the tarantula, are plentiful save in the driest valleys; scorpions are common, and in some localities rattlesnakes abound.

Though the diurnal fauna is rather meager, it is probable that the fauna as a whole is, like the flora, fairly rich in species though poor (yet hardly so poor relatively as the flora) in individuals.

CHARACTERISTICS OF THE VEGETAL LIFE

Perhaps the most conspicuous feature of the flora, except on the higher mountains, is the dearth of foliage. The distinctive desert types—cactus, yucca, agave—are leafless. The mesquite, the prevailing arboreal form, is indeed leaf-bearing, but away from the naturally or artificially irrigated valleys the leaves, always small, are so reduced in number and size as scarcely to conceal the twigs and branches, and during the long dry seasons the oppositely arranged pinnate laminæ are so closely folded as to display little verdant surface; the greasewood (*Atriplex* of several species) and rabbit-brush are also small-leaved and their foliage, like that of the mesquite, folds up or falls off during the four-month drouths. Most of the paloverdes are leafless throughout the greater part of the year, some of them are said to be always; and whole acres of chaparral are almost entirely leafless during the drier months, displaying only a greenish gray or bluish brown wilderness of trunks, branches, thorns, and naked petioles. Even in the valleys where the trees drink from the sands below rather than from the air above, and where trunks, stems, and fruits are luxuriant, the dry-season foliage is scanty and the leaves are folded or rolled in such manner as to present a minimum surface to the air and to view—the pinnate leaves fold along the midrib, the palmate leaves of the sycamore roll themselves into slender cylinders, while other trees shed a part of their leafage soon after the end of each rainy season, to send forth a fresh foliage with the beginning of the next. Away from the watercourses the smaller shrubs are leafless brambles; and even the grasses are strong-stemmed with short and narrow blades. The humid lands of the lower latitudes are clothed with the foliage of trees, grasses, and other annual and perennial plants during most of the year; but in Papagueria, as in other semi-desert regions in some measure, this mantle fails and the land is naked or at best thinly veiled by earth-colored stems and branches, so that the plains and hillsides are more barren in appearance than in reality and often belie their own fertility.

Nearly as conspicuous as the absence of foliage is the presence of aberrant types, chiefly of robust, pulpy forms, peculiar to the desert. The great saguaro (*Cereus giganteus*), rising 20 to 60 feet in a single stem 1 to 3 feet in diameter or in a massive candelabrum, bare in the distance as a carved monolith, is the dominant form; and its huge waterlogged stems, ghostly grayish by night and ghastly greenish by day, are unlike the typical plant forms of the earth and impress the traveler as incongruous with nature. In Sonora the congeneric pitahaya abounds; with its great curved branches, each a tree-trunk in size and a mushroom in texture, it is nearly as extravagant in comparison with typical plant forms as the saguaro. Over the lower plains the closely related and equally monstrous cina (*Cereus schottii*) takes the place of saguaro and pitahaya, and dominates the shrubbery. The okatillo (*Fouquieria splendens*) with its bare, wide-branching stems approaches somewhat more nearly, and the tree-okatillo (*Fouquieria spinosa*?) still more closely, normal arboreal forms; but the nopal and nopalito (*Opuntia*, different species of the flat-stemmed type) are no less aberrant, though less conspicuous than the saguaro. The cholla (*Opuntia* with cylindrical and prismatic stems) and other arborescent cacti are fairly congruous with trees and shrubs in general habit, though not in texture, and thus contribute measurably to the strangeness of the landscape. The agaves and yuccas are only less striking than the cacti; and the pale green, bare-branched paloverde (*Parkinsonia torreyana*), with slender needles or minute pinnate leaves in lieu of normal foliage, is hardly less aberrant. This assemblage of incongruous plant forms gives character to the desert landscape.

Another conspicuous feature of the flora of Papagueria, like other desert regions, is the abundance of thorns, with which nearly all the plants are beset. The saguaro and pitahaya and their kind are armed with lines of chevaux-de-frise extending from base to summit; the nopal and the cholla are set with wide-branching bunches of barbed needles; each branch of the okatillo bristles with a thousand spines, and the water-bearing visnaga (*Echinocactus wislizeni lecontei*) is crowned and clothed with an impenetrable armor of natural bodkins and fishhooks. The yuccas and agaves abound in serrated and plain knife edges, and in many species the needle-tipped and spike-fringed fronds turn outward and downward in serried armature. The chaparral is

a wilderness of thorns; the dwarfish oak trees on the mountain sides are beset with needle-pointed knobs; the mesquite and smaller mimosas on the more arid plains bristle with thorns, and during the dry season the shriveled and case-hardened petioles are transformed into cruel spikes; the greasewood and other shrubs are crowded with irritating spines and bristles, and even the mild-aired paloverde is armed with pointed and sharp-edged processes. Certain ephemeral plants that spring up about the burrows in the shadow of the mesquite trees have holly-like thorns at the serrate leaf-tips, and the grass blades are knife-edged and needle-tipped, while the seeds are enclosed in spiked hulls or fringed with spiny awns. In all the land of the Papago there are few indigenous plants that are not armed with thorns or spikes or spines, or all combined.

The thorniness of the desert plants is associated with a peculiar modification of the surface of stems, leaves, and fruits, often in the direction of cutinization, sometimes in the direction of hairy coverings.* From root to terminal twig the paloverdes are glazed with a resinous epidermal tissue; the pulpy stems of the saguaro and its congeners are enclosed in a thin but strong waxen skin, grading into the natural lacquer coating the spines; the mature leaves of the arborescent flora on the mountain sides and along the waterways alike are thickened and harsh rather than velvety of surface, and many appear to be coated with natural varnish; a few trunks are rough-barked, but usually the branches and twigs are smooth and case-hardened. The seeds of the saguaro imbedded in the pulp of the fruit are hard and shining of surface; the mesquite beans are firmly implanted in woody pods, yet are smooth and hard, and the smaller mimosa over the Sonoran slopes bears beans in a thin-walled pod that are as hard and glossy as lacquered lignum-vitæ; and the fruits and seeds of annuals are so hard as to form a favorite material for beads among the Papago women and children. Many of the shrubs bristle with a stiff pilage from root to petiole, and sometimes the leaves are hairy or coarsely furred, particularly as the moister season wanes; and many of the bristles are barbed and brittle, and hardly less forbidding than the thorns and spines.

Another noteworthy characteristic of the plants of Papaguëria is the green color of the stems and trunks. In humid lands the

*The hairiness of the desert plants has been noted by Coville in Death valley.

foliage is green, the trunks and stems generally gray or brown or black, the grasses green throughout, while in the arid regions, where the foliage is largely lost, the verdure pervades the permanent body of the plant; the nopal may become purplish or yellowish and the okatillo gray or brown, the trunk of the cholla may turn dark brown, but in all there is an element, and generally a predominant element, of green, and when the setting sun reddens the chance cloud banks even of the dry season the complementary green of the cacti-clothed landscape becomes almost brilliant. The yuccas and agaves are green, greenish gray, or greenish yellow, yet never without the element of green; the paloverdes are a soft and sickly green from root to topmost twig; all of the minor and many of the main branches of the mesquite and chaparral are tinged with green; the creosote bush (*Larrea tridentata* or *mexicana*) is a dark rich green, especially during the winter months; even the silver grass is seen in the reddened rays of the setting sun to show a greenish shade. The predominant tone of the desert landscape is gray, the color of bare earth and rock; but there is a strong undertint of green coming from the tenuous veil of stark and thorny albeit leafless vegetation.

In much of Papagueria these features are partially masked and the landscape transformed during the rainy season. Even a casual dry-season storm produces a decided change: The pinnate leaves of mesquite and paloverde and smaller shrubs open and fresh leaflets appear, and the foliage-bearing plants partially eclipse the cacti; in the arroyos the willow and ash leaves expand to their widest, the sycamore leaves unroll, and the yellowish green foliage of the cottonwood brightens; with the expansion of the old leafage and the burgeoning of the new the prevailing thorns are concealed; the desert varnish softens and stretches with the growth of trunks and branches; the silver-gray grasses assume a greener tinge, and in the general verdure the sickly green of the cacti and agaves pales by contrast.

The seasonal changes no less than the dry-season characteristics of the desert flora suggest a meaning for the assemblage of distinctive features. The seasonal changes indicate that certain features, like the dearth of foliage, are partly, perhaps largely, individual or ontogenic; while the persistence of certain features, such as the development of aberrant forms, the permanence of thorns, and body verdure, appear to be essentially phylogenic.

The chief function of the leaf is transpiration; but in the heated air and long drouth of the arid land a constantly transpiring plant soon withers and dies. So it would appear that in some way, through the law of natural selection, plants of luxuriant foliage have been eliminated (save along the lines of abundant groundwater), leaving plants of scanty foliage to dominate the soil. Moreover, under natural selection, as it would appear from comparison either of given species or of the floral assemblage with those of humid regions, an individual plasticity has been developed whereby the functioning of the foliage is rendered periodic in an exceptional degree; and those individuals persist and leave most progeny that are best able to adjust the rate of transpiration to the varying conditions of season. The adaptive devices developed in this hard environment are many and suggestive. Compound pinnate leaves fold easily, and so plants bearing this type of foliage abound, and some, like that of the mesquite, have become so delicately adjusted to external conditions as to fold under shock even in the humid season—indeed sensitive plants abound throughout the deserts. The rolling up of the palmate leaves might almost be termed an ingenious device and interpreted as an index of high intelligence in the tree; and the prompt burgeoning of new leaves as the air grows humid and the rain comes down is an almost pathetic expression of gratefulness, and indicates a wonderful delicacy of adjustment between organism and environment. The leaf-bearing plants of Papagueria are conspicuously characterized by certain collective habits rather than by classic features; it is by means of these habits that they are enabled to survive the nearly continuous drouths; and thus while the habit is individual in expression, it is undoubtedly hereditary in the perfection of its development. The inference from the foliage-bearing trees is sustained by the facts of the development of other plant forms, like the cacti and the paloverdes, in which leaves are lacking. The cacti represent an aberrant type, but the paloverdes are trees in all characters save the color and texture of the bark and the dearth or absence of foliage; they prevail only in arid regions, and in the drier localities displace even the deep-rooted mesquite and the abstemious greasewood; and they are undoubtedly the product of a long-continued process of adaptation through natural selection to an arid environment.

The predominance of thorns may in part be correlated mechanically with the elimination of foliage, for as the lamina withers the petiole or axillary processes sometimes shrink and case-harden and become potential thorns; but the vast multiplication of real thorns cannot be so explained. An explanation appears when the relations of the plants and herbivorous animals are studied. The thornier plants are better protected from the animals, and thereby their chances of survival and procreation are enhanced. Moreover in the arid region, unlike the humid land, the struggle among species is not territorial or numeric but individual;* it boots nothing to the plant to yield ten thousand seeds where only ten young plants can be supported; and it is of no avail to a species in the unconscious effort of vegetal vitality to cover its vicinity with progeny so abundantly as to exclude other species, since the parched soil will support but a few plants, and parents and progeny alike would famish. In the humid land the species is perpetuated through multiplication of individuals, and within limits through territorial dominion; but in the arid land the relations are changed, and perpetuation of the species is secured chiefly or solely through prolonging the life of the individual. Thus the thorny armature is doubly beneficial; for it first prolongs the life of the individual, which is preëminently essential to the perpetuity of the species where only a few individuals can exist, and then increases the chances of long-lived progeny in sufficient yet not redundant numbers. These relations suggest that the desert plants should be found exceptionally long of life and exceptionally scant of seeds; and while further observation on these points is needed for demonstration, and while some other relations enter, there is reason to opine that long life of individuals and either limited numbers or small size of seeds are characteristic of the desert flora—*e. g.*, the typical saguaro bears minute seeds, though in considerable numbers, and is exceedingly slow of growth. The many adaptive devices of plant effort for wide distribution of seeds and phytons (for the cholla and perhaps other cacti seem to have re-

*Coville, speaking of the flora of Death valley (Contributions from the U. S. National Herbarium, vol. iv, p. 43), says: "It is evident * * * that desert shrubs essentially present in their environment the anomaly of a struggle for existence, not against other plants, but against non-organic physical forces alone." This admirable report was not seen until after the expedition to Papagueria, nor indeed until after these paragraphs were written.

verted to the mode of reproduction by vegetative propagation *) must be passed over; it suffices to note that the development of a protective armature of thorns in arid lands seems to be natural and necessary and the outcome of phylogenetic modification. It is significant that in the case of thorns, as in the case of scant foliage, a characteristic habit of unrelated plants rises above specific affiliations—taxonomically the flora is widely diverse, but in this as in several other characters it is singularly uniform in habit, so that the specific differentiation of the ages is partly masked by a conspicuous unification in a certain direction.

The lacquered and pilose surfaces of desert plants affect transpiration. With the cutinization of leaves the stomata are contracted or covered, with the exudation of resinous or waxy substances the twigs and trunks become coated with an impervious varnish, and with the natural lacquering of the seeds they are preserved unto the ensuing moister season when the lacquer softens and the germ quickens; the barbed bristles of leaves and stems protect them from at least the smaller herbivores, the harsh or soft pilage catches and holds the moisture from the rare rains and dews, and the pubescence measurably protects the plant against changes in temperature.† Thus it is evident that the cuticular modification of the desert plants is beneficial individually and hence phylogenically; and the noteworthy development of these modifications, like the other characteristics of the flora, may be explained as adaptations through survival of the fittest.

The cactus is essentially a reservoir of water pumped from beneath and confined by a thin yet impervious shell, protected by an armature of thorns; and though of different form, the agave and yucca are essentially similar in plan. So the aberrant plant types characteristic of the desert are most conspicuously, if not preëminently, adaptive devices for the storage and presumptively for the most effective use of water; in them the energy of the plant is mainly expended not in the multiplication and diffusion of individuals, nor in energetic growth of individuals, nor in the development of permanent structures (for the cacti are notable for their paucity of woody or other permanent tissue), but in storing a single substance against the time of scarcity that the

* Toumey has recently described the mode of reproduction of *Opuntia* in southwestern Arizona by the distribution of joints or fragments.

† The last-named function of the plant hairs is specifically recognized by Coville.

individual may maintain a lowly and feeble vitality for a long period. The roots of the pulpy desert plants are long and often large; yet when these plants are compared with the vegetal organisms of humid lands, it seems manifest that the function of the water collected by the roots and stored in the stems is peculiar—the substance appears to perform its duty not so much by flowing through, as by remaining in, the tissues. Accordingly the desert plant appears to be an exceptionally effective mechanism for utilizing the power of water, a high-power chemical engine rather than a low-power hydromotor; and the predominance of these forms may be ascribed to the selection and development of this peculiar quality through survival under adverse conditions. The phylogeny of the pulpy desert plants is obscure; but it is probable that the genera and species were developed with relative rapidity during the later geologic periods to fit the peculiar assemblage of conditions found in arid lands. Yet although geologically modern, they are in many respects allied to primitive plant types, and are in many ways antithetic to the higher types differentiated during the ages to fit the conditions commonly prevailing over the lands of the earth. Thus the forms are aberrant, incongruous with prevailing vegetation, though accordant with a distinctive set of conditions; and in the development of this accordance they have assumed the habits of leaflessness and thorniness impressed on unrelated forms by the same rigorous conditions; so that the adaptive similarities have in some respects eclipsed real homologies.

The paloverdes are enclosed in an impervious glazed skin or bark, somewhat resembling the dermal covering of the cactus and agave; their conspicuous feature, which they share with the pulpy desert plants, is the green color due to abundant and widely diffused chlorophyll. Similar coloration, though generally in less degree, prevails in the trees and shrubs of Papagueria, where twigs and smaller branches, if not main stems, are commonly greenish, sometimes clearly green as in the paloverde. Now, according to Lommel and others, and as taught by Vines,* the function of chlorophyll is to absorb certain rays of light, and thus to enable the protoplasm with which it is connected to avail itself of the radiant energy of the sun's rays for the construction of organic

* Lectures on "The Physiology of Plants," Cambridge, 1886, Lectures ix, xiii, xvii, etc.

† *Ibid.*, p. 157.

substance from carbon dioxide and water.† Considering chlorophyll with its associated substances as an adaptive mechanism for utilizing the energy of light for the behoof of the plant in which it is produced, then it is especially beneficial to the meager flora of the desert; for not only are the individual plants so widely scattered that the solar rays reach all parts of the organism above ground level, but the insolation is much stronger than in humid lands, and is rarely checked by clouds. It seems probable, too, that the exceptionally effective utilization of water in the pulpy plants is directly connected with the action of the chlorophyll; but whether this is the case or not, the abundant development of chlorophyll in the stems and trunks of leafless or scant-leaved plants is unquestionably adaptive through the survival of the chlorophyll-bearers.

The great lesson of vegetal life in Papagueria is found in the delicate adjustment of the varied flora to the dominant condition of aridity. Some species are adjusted to the condition largely by modified habit of foliation; other species, like the paloverdes, represent profound modification of the arboreal type; while the dominant forms, cactus, agave, and yucca, represent still more profound modification of subarboreal, if not primordial vegetal types; and all of the plants, howsoever divergent phylogenically, are notably convergent in a certain group of characters, including leaflessness, waxiness, hairiness, thorniness, and greenness. By some naturalists the divergent characters of organisms are classed as natural or biotic, the convergent or composite characteristics as artificial or demotic; but under this classification the common peculiarity of the unrelated desert plants would become vegetal artificiality. This distinction need not be pursued; it suffices to note that the desert flora reveals in strong light the exceeding adjustability of even the more fixed organic types to environment, an adjustability so delicate that the affinity thereof masks and modifies consanguinity.

Great interest attaches to the Papago Indians as the inhabitants of a desert; yet the extent of the interest can be appreciated only when the exceeding rigor of their environment, as manifested by the flora of the district, is understood. Even if the Papago were not interrelated with the flora, as will appear later,

it would be desirable to consider their relations to an environment which transforms the stabler organisms of the earth.

CHARACTERISTICS OF THE ANIMAL LIFE

A noteworthy feature of the animal life of Papagueria is the protective coloring of many of the birds, animals, and reptiles. The quail and dove are slaty-gray and not easily discriminated from the gray or ashen earth, rocks, and plants of their haunts; the coyote approaches the color of the ground with its scant vegetal coloring, and is said to change color with the seasons, becoming darker with the wet, lighter with the dry; the lizards are in part bright-colored but in part gray, brown, or leaden, and some are chameleons, changing color with their surroundings; many insects, too, display protective coloring, and some, like the mantis, have acquired twig-like or leaf-like forms. These characteristics of imitative protection are prominent, yet perhaps not more constant than in other regions.

Another feature of the animal life is the fleetness and staying power of a considerable number of animals, including the deer, antelope, jackrabbit, coyote, and certain smaller mammals, as well as the bright-colored lizards and some of the hawks. Collectively the fleetness of the fauna may be adventive rather than characteristic, yet it is of interest in connection with another feature with which it would appear to be reciprocally related—*i. e.*, the venomous character of various sluggish animals. The latter feature is one which cannot easily be evaluated by reason of the frequently absurd popular beliefs on the one hand, and the antithetic tendency to exclude all evidence of venom on the other hand. It is certain, however, that the rattlesnake, which abounds in some localities and is probably the most numerous ophidian, is both sluggish and venomous; the dull and slow-moving Gila monster (*Heloderma suspectum*) is almost certainly venomous, at least under certain conditions; the indolent but pugnacious tarantula is undoubtedly poisonous; the apathetic scorpion and the clumsy centipede are more or less poisonous; the bite of the greatly feared though lazy large-head ant of Sonora and other Mexican provinces produces festering sores, whether with venom or otherwise; there are a variety of wasps, including one of great size and slow movement, whose stings are

poisonous; in southern Sonora the local katydid is more feared than rattlesnake or tarantula, its sting being supposed invariably fatal; and there is a large body of evidence indicating that the sluggish skunk under certain conditions communicates a poison akin to that of rabies. Thus a notably large number of animals are known or supposed to be venomous; even excluding all concerning which there is reasonable doubt, the ratio of venomous to non-venomous species would seem to be large. Granting the presence of venom, it may easily be explained as the prevalence of thorns among the flora may be explained: In a region capable of supporting only a relatively small number of organisms per unit of area, the perpetuity of species is best secured by the protection of individuals. Now certain lizards, insects, and birds are protected by mimetic coloring or form, the *Phrynosoma*, like the plants, is guarded by a thorny armature, and the chameleons are shielded by a physiologic mechanism for color-change; but it would seem that venom forms at the same time a more effective and a more economical means of protection, perfected by phylogenic modification through survival.

At first blush the fauna of Papagueria displays less of modification than the flora in the direction of fitness to a rigorous environment; and this relative immunity may be ascribed to the power of locomotion, which permits animals to emigrate from the most arid sections during the driest seasons, so that the mechanism of locomotion partly replaces the static mechanism of resistance developed in the stationary plant. On closer examination it is found, however, that the immunity of the animals from desert transformation is apparent rather than real; the animals, no less than the plants, are delicately adjusted to their environment; but the modification is superorganic or social rather than organic, as in the case of plants. This faunal modification is of special interest to the student of desert tribes, in that it is a connecting link between man and lower organisms.

THE COÖPERATIVE CHARACTERISTICS OF LIFE

Although the animals and plants of Papagueria display pronounced individuality, and although some of their most prominent features are adaptive devices for securing independence, a striking peculiarity of the region is the coöperation among living

things. Along the lines of groundwater the species are measurably or wholly antagonistic to their neighbors of distinct species; but over the arid uplands and in the broad waterless valleys all plants coöperate, not only with plants of distinct species but with animals, for the maintenance of common existence. Sometimes the coöperation involves little modification and no loss of individuality on the part of the agents; this type may be called *communal*: in other cases the coöperation is so intimate that animals and plants are not only mutually helpful but so closely interdependent that neither could exist without the aid of the other; this type may be called *commensal*.

Communality.—A mesquite springs up on the plain; within two or three years the birds resting in its branches drop the seeds of cacti, some of which, like vines, are unable to stand alone; and the cactus and the mesquite combine their armature of thorns for mutual protection. Then wind-blown grass seeds lodge about the roots, and grasses grow and seed beneath the sheltering branches; and next small mammals seek the same protection and dig their holes among the roots, giving channels for the water of the ensuing rain and fertilizing the spot with rejectamenta. Meantime the annual and semi-annual plants which maintain a precarious existence in the desert take root in the sheltered and fertilized soil beneath the growing cactus and mesquite, and in season it becomes a miniature garden of foliage and bloomage. Then certain ants come for the seeds, certain flies and wasps for the nectar, and certain birds to nest in the branches. In this way a community is developed in which each participant retains individuality, yet in which each contributes to the general welfare. So advantageous is the communal arrangement that few organisms of the drier portions of Papagueria pursue independent careers; the vast plains are dotted with communities or colonies from a few rods to some furlongs apart, while the intermediate stretches are practically lifeless; and the very soil is molded into a succession of hillocks with bare glades between, which persist even after the extermination of the colonies through climatal change or through human intervention. Thus do a large part of the plants and animals of the desert dwell together in harmony and mutual helpfulness; for their energies are directed not so much against one another as against the rigorous environmental conditions growing out of dearth of water.

This communality does not involve loss of individuality, which prevails throughout Papagueria—indeed the plants and animals are characterized by an individuality greater than that displayed in regions in which perpetuity of the species depends less closely on the persistence of individuals. By reason of this individuality there is a certain enmity between the animal and vegetal colonists. The small birds devour the seeds of the cactus and the squirrels nibble the beans of the mesquite, yet not all of the seeds are eaten, else a succeeding generation of birds and squirrels would starve; the spiders suck the blood of the flies and the wasps paralyze the spiders to serve as food for their young, yet not all of the flies and spiders are slain, else their enemies would famish; the hawks and eagles rend the small birds and squirrels, yet not all of the peaceful creatures are rent, else the birds of prey would perish; deer and antelope and, since the coming of white men, burros and kine crop the grass and browse on the tender twigs, yet not all the grass and young shoots are consumed, else the herbivores would suffer and die. In some respects the enmity of the colonists is more bitter than that of antagonistic species in humid lands; yet it is adjusted and developed into a marvelous solidarity under which the sum of possible vitality is increased apparently to a maximum; singly or collectively the colonies support more plants than they would be able to support without the aid of their animal associates in the distribution of germs and in fertilization; they support more insects than could live with a sparser flora; they support more herbivores than could be kept on a flora not fertilized by insects; collectively the colonies support a carnivorous fauna which could not exist if either the herbivorous things or the plants on which they live were destroyed. If the vitality of the desert were limited to any one type the sum would be reduced nearly or quite to nothingness, for few of the plants and none of the animals are independent of their communal associates. The solidarity of life in the desert is far-reaching and rises above the antagonism of individuals and species, for its strength is directed against the hard inorganic environment.

Commensality.—Over the great alluvial aprons and in other tracts of firm but not too stony soil the fields of the farmer abound. Where the soil is particularly suitable the farms adjoin and cover most or all of the surface over scores of square miles.

Each farm includes a clean and well-kept threshing-floor and drying-ground 5 to 30 feet across, with the passageway to the subterranean habitation in the center, and an annulus 3 to 20 feet wide of luxuriant grass, on whose seeds the ants subsist. Across these annuli run great turnpikes often a foot wide, connecting farm with farm, sometimes for furlongs. In such a farming district there is practically no vegetation except the cultivated grass; not only are other grasses and weeds kept down, but even the relatively mighty cactus, greasewood, and mesquite are apparently exterminated—certainly the prevailing plants of the region are absent from the most extensive and best cultivated farming districts. Thus the tiny formic farmers have developed an art of agriculture, have made conquest of the land for their needs, and have artificialized a plant apparently as completely as man has artificialized corn and rice; and in the process they have increased and multiplied to such an extent that they would die of famine in millions if their crop should fail, while it seems almost certain that their crop-plant would quickly die out if the cultivation and perhaps fertilization by the animals were withdrawn. Thus the rigorous environment of the desert has developed one of the most remarkable intelligences of the world, and has rendered two widely different organisms interdependent.

To the traveler the saguaro is, partly by reason of its loftiness, the most prominent element in the flora. Now the young stem of this cactus shoots with considerable rapidity as a rather slender column, at first without flower or fruit. After a period said to range from 5 to 10 years, and after a height varying from about 5 to 15 or more feet has been attained, the plant begins to bear and the rate of upward growth diminishes. Thereafter it slowly thickens and still more slowly increases in height; and in time branches start out at right angles to the trunk and soon turn upward to form a giant candelabrum. Now it is noteworthy that the height at which the saguaro begins to flower and fruit varies from district to district with the height of the local flora; in a district of greasewood and scrubby chaparral the flowering may begin at a height of only 5 to 8 feet, while in a district of vigorous mesquite the flowering may not begin until the stem is 10 feet higher. It is noteworthy also that in the typical districts the branches, if not more than 3 to 5 in number, usually spring from just below the height at which flowering began (the supernu-

merary branches spring either sporadically or above the ordinary level of the tops of the first crop), and that the branches always grow more slowly than the youthful trunk, perhaps no more rapidly than the well-grown trunk from which they spring. Thus the saguaro would appear to be in some way correlated with the surrounding vegetation, and while the correlation might be ascribed to soil differences it seems probable that the connection is more complex. On examining a large number of examples in many districts the impression is produced that the mindless aim of the saguaro, through the survival of the fittest, is first to rise above its neighbors rapidly as possible before expending energy in reproduction; that it then rests from the activity of stem-growth and divides its energy between gradual expansion and strengthening of the trunk on the one hand and reproduction on the other, yet continues slowly pushing upward until it dominates the landscape; and that when the main stem becomes extravagantly high the branches consume most of the energy of growth. A reason for this erratic behavior is found when it is observed that the flowers are fertilized by insects and that the seeds are distributed by birds; for it is manifest that the finding of the plants by flying things is facilitated by their great stature. Moreover the flowers are brilliantly white in color and attractive in perfume, while the fruit is gorgeously red and sweetly sapid. Still further it is manifest that the typical placing of branches is the most economical possible at once for the pumping of water from below and for bringing the flowers and fruits at the extremities within easy sight of the coöperating insects and birds. So it would appear that the saguaro is a monstrosity in fact as well as in appearance—a product of miscegenation between plant and animal, probably depending for its form and life-history, if not for its very existence, on its commensals. Whether the small black insects that suck the flowers and distribute pollen are wholly dependent on the saguaro for existence, like the yucca moth on the yucca (as shown by the lamented Riley), is questionable; and it is hardly probable that the birds that consume the saguaro fruit are so dependent on it as to have undergone actual differentiation of characters fitting them to the commensality.

The lesson of coöperation among subhuman organisms in Papagueria is the solidarity of life to the extent that the vital

energies of plants and animals are directed primarily against the inorganic environment, rather than against kindred and alien organisms, while one of the results of this solidarity is the development of strong individuality. By reason of this coöperation the desert was in part reclaimed and a series of superorganic organizations—unconscious and undesigned but none the less beneficial—was developed before the advent of man. In general, social and other institutions are a product of human intelligence alone; and it is of interest to the anthropologist to learn of the growth of organizations among lower organisms, and of special interest to study the effect on mankind of an environment so peculiar as to produce subhuman communality.

CHARACTERISTICS OF HUMAN LIFE

The Papago Indians are *the* desert people of North America. They dwell among the cacti, paloverdes, mesquites, and barren plains of a region in which human enemies cannot survive. They are semi-nomadic in habit; they migrate northward in spring, southward in autumn, with tolerable regularity, and remove their rancherias with the starting and failing of springs and with other changes in water supply. In the wanderings of generations they have acquainted themselves with meteorologic conditions and with every constant and inconstant source of water; thereby they have acquired an advantage over the invader, who is soon fain to retire or famish.

One of the first characteristics of the Papago to strike the observer is his capacity for abstinence: The Papago vaquero will ride one, two, or even three days without drinking, under a sun so fierce and in an air so dry that the tenderfoot dies of thirst in a few hours; and a family of a dozen often confine themselves for weeks to the contents of a single olla daily for drinking, cooking, and all other purposes. So, too, they live on reduced rations of solid food for considerable periods without inconvenience; indeed their habitual diet is moderate, even allowing for the condensed and nutritious character of some of their foods. When the interpreter was asked how the people of a rancheria were able to subsist for a winter on a certain limited supply of food, he replied, "They eat only twice a day, and if there is not enough they eat only once." The abstinence from solid food is in a measure apparent only, for the Indians are disposed to glut-

tonize in idleness when opportunity arises, when their capacity for consuming is no less striking than their power of abstaining. This characteristic of the tribe is possessed by other primitive peoples, perhaps in nearly equal degree; yet it is noteworthy as displayed among these Indians.

Another characteristic of the Papago is strength and fleetness: A withered crone (shown in the photographs of the expedition), weighing apparently not more than 80 or 90 pounds, arose from the ground with a kiho containing a stone mortar 196 pounds in weight, carried this burden more than half a mile over a sandy road, and then let it down from her back, and this without perceptible exhaustion or attracting particular attention among her neighbors. Many equally noteworthy feats of strength and endurance might be enumerated. Fleetness is displayed in the tribal game of kasháneku, or football, in which it is not unusual for contestants to run, kicking the ball before them, 30 or 40 miles in an afternoon. It should be observed that fleetness has apparently declined among the Papago since the introduction of the horse; yet they and other desert tribes have always been noted as runners: Bartlett found the Oyata couriers to run 40 or 50 leagues (105 to 131 miles) in 24 hours, and Lumholz mentions that a Tarahumari Indian has been known to carry a letter nearly 800 miles in 5 days (these tribes belong to the same family as the Papago), while the Seri, who have never acquired the horse, are noted as *the* runners, par excellence, of this region of runners. Thus, although perhaps not especially distinguished, the Papago Indians are noted for strength, celerity, and endurance.

A third characteristic is apparent longevity: In every rancheria wrinkled and gray grandames and grandsires are found, generally in considerable numbers, and usually engaged in arduous labors; it is the aged woman who bears the heaviest burden, and her consort who performs the hardest field task, for the family. It is impossible to obtain exact figures concerning the age of the old people, but the proportion of the active aged is manifestly much larger than among civilized peoples. In this respect, too, the Papago is more or less like neighboring tribes, all of whom claim patriarchs and matriarchs who have far outlived the normal span of life.

Combining these and other characteristics of the desert tribe, it appears that they are in harmony with the characteristics of

the animals and plants; yet they are not so well developed as to clearly distinguish the Papago from other tribes, especially from those of other portions of the arid regions. When the physiologic or biotic characteristics of plants, animals, and men are compared it appears that the plants are most and mankind least modified in the direction of fitness to environment, the subhuman animal occupying an intermediate position.

Turning to the institutional or social aspect of the tribe, certain fairly distinctive characteristics are found, yet they are measurably masked by reason of the transition from the primitive state to the accultural condition initiated with the introduction of European crop-plants and stock. Fortunately there is a sufficient vestige of primitive culture to indicate many of the primitive customs. The Papago combined the chase for animal quarry with the search for vegetal foods; he gathered the fruits of various cacti and mesquite beans in season; he collected indurated pericarps and berries for beads; in his southward migrations he obtained seeds of corn and pumpkin as well as native beans—indeed it is probable that the primary purpose of the migration was the collection of seeds,—and on his return in the rainy season these were planted about the water holes and arroyo deltas, and in time the crop was gathered. There are indications that a tribal organization grew out of these customs; but this question need not now be pursued. It suffices to note that, as a consumer of seeds and fruits and as a distributor of seeds, the Papago entered into the vital solidarity of the desert and contributed toward the perpetuation of species that were good in his sight. In this way he made partial conquest of the soil and the productions thereof for his own behoof, and still further increased the sum of desert life; yet his conquest of the land at the time of the coming of the Spaniard was far from complete, apparently less complete than the conquest made by the farmer ant; and the historical Papago has never controlled the scant waters of his domain, but sought them where they chanced to occur in the hazard of storm and sun, just as he chased game and hunted wild fruits.

For three and a half centuries the Papago has been in contact with an alien culture, and there is evidence that during a preceding century or more he suffered through the repeated invasion

of his borders by his hereditary enemy, the Apache; thus the indigenous Papago culture can hardly be considered as independently autochthonous or indigenous—the process of culture development was undoubtedly effected by external influence. Fortunately the prehistoric remains of Papagueria throw light on an antecedent culture which appears to have been essentially indigenous; and there is reason for opining that the prehistoric peoples were the direct ancestors of the Papago and certain other southwestern tribes.

The prehistoric remains comprise greatly reduced ruins of villages and irrigation works, as well as “*las trincheras*” (or intrenched mountains), with included or associated pottery of fine texture and finish, and highly polished stone implements; these relics being abundant and distributed over a considerable part of Papagueria. Now, on comparing the ruins with modern artificial works (including those of the sedentary Mexicans who have pushed far into the arid district) certain important differences are found: In the first place the ancient villages were much larger than the modern rancherías of the Papago; in the second place the ruins are much more numerous than the Papago rancherías and Mexican settlements combined; again the ancient irrigation works (of which the Papago have none) are much more extensive than the modern acequias, dams, and reservoirs of the Mexicans; and finally the trincheras are unique. The great extent of the prehistoric irrigation works is especially impressive; the ancient acequia in Arivaca valley was raised above the flood-plain and 150 feet in width, the confining banks being occupied by nearly continuous rows of habitations, while the modern acequia, put in through American enterprise, is a simple ditch 8 to 10 feet wide; and a single one of the many prehistoric villages in the valley comprised 130 habitations, or fully twice as many as those of the modern American, Mexican, and Indian inhabitants. It may be noted also that a village in this valley and one or two others elsewhere have remains of what appear to be corrals containing tanques for water, indicating the domestication of a rather small animal (perhaps the vicuña). Viewed collectively, the prehistoric remains indicate an ancient population much more extensive than that of the present; for the great number of the villages may not be ascribed to successive occupation, since the irrigation ditches are so large and carried so far up the valley sides as to be

adequate for the supply of a large contemporaneous population and at the same time to be inconceivably extravagant if only a small population were to be supplied at a given time. It is of course possible that the prehistoric precipitation was greater than that of the historical period, but there is no special warrant for this supposition, which is moreover inherently improbable and also unnecessary. It may be observed summarily that the archeologic and ethnologic data in the region indicate a numerous and peaceful agricultural population at a period probably between two and five centuries before the Spanish invasion, and suggest (1) that this population began to suffer from forays by a predatory enemy dwelling in the high Sierra, (2) that the system of forays gradually grew into warfare for vengeance and reprisal, (3) that the peaceful folk found a temporary refuge in the trincheras, and (4) that the irrigation works were finally destroyed, whereby the valley tribe was all but annihilated and driven partly into the remoter desert fastnesses, partly into the more northerly valleys tributary to the Colorado—the desert remnant being the immediate ancestors of the Papago. It is not necessary to dwell on the details of this succession or even to affirm its verity beyond the trustworthiness of a good working hypothesis; the essential point, which seems to be indisputable, is that the district supported a numerous agricultural or largely agricultural population, who were able to maintain themselves, despite the prevailing aridity, by means of an elaborate system of irrigation. This population and culture seem to have been essentially indigenous, and, up to the time of decadence, not greatly influenced by external conditions. Accordingly, during the prehistoric period represented by the ruins, the indigenes of Papagueria made conquest, not only of the soil as do the modern Papago, but of the waters; and thereby their culture rose to a higher plane, yet a plane which may justly be regarded as normal to the desert.

The lesson of human life in the desert is found in the coöperation between men, animals, and plants in such wise that the sum of vitality is multiplied and at the same time subordinated to intelligence: Man consumes fruits and seeds, yet distributes the germs of plants useful to him; as he advances in culture he conserves the germs unto the season of germination; he either neglects or directly destroys useless and noxious plants; and in

all these ways he improves the flora. Man subsists in part on game, yet, under the economy of solidarity, he does not exterminate the game animals and thereby cut off a supply at its source, but rather coöperates with them in a communality analogous to that between the animals and plants; he aids, albeit unconsciously, the herbivores in escaping the carnivores, and for this service they pay tithes in flesh; he even enters into coöperation with carnivores, such as the coyote, which he spares to become his scavengers, and they reciprocate by forming a semi-conscious cordon of protectors about the camp or village; and in these and other ways a partial cultivation of plants and domestication of animals is brought about collectively, and man enters into and dominates the solidarity of desert life. Then if peace persists he begins to transport and preserve water, and this is the germ of irrigation by which the wilderness is made to blossom and by which both plants and animals are multiplied and artificialized.

INTERRELATIONS OF LIFE

When the plants, animals, and men of the desert are compared with respect to physiologic or ontogenic characters, it is found that the stationary plants have suffered greatest modification, the environment-driven animals less, and the environment-molding humans least of all; but when they are compared with respect to collective or demotic modification, it becomes manifest that the moveless plants are least, the moving animals more, and prevising men most profoundly modified.

When the life of the desert is compared with the vital phenomena of humid regions, it is found that under the pressure against an adverse inorganic environment, the beginning of the control of environment springs lower on the stem of phylogenic development—that the desert species, genera, and orders enter into a mutually beneficial coöperation while yet the rain-fed organisms are frittering energy in internecine strife. Thus it would appear that among plants and animals, as among men, hard necessity is the mother of progress. It would also appear that among plants and animals, as among men, strength lies in union; and progress in combination leads to solidarity.

The great lesson of plants, animals, and men in the desert is found in the modification of organisms and the development of

organizations: Under the hard environment, organisms cease to strive against one another and each strives against inorganic nature; under the common pressure they are forced into union, and thus coöperation is initiated. Now there are three stages in coöperation; the first stage is that in which the organisms merely stand together for mutual protection, but retain undiminished individuality—this is communality; the second stage is that in which individualities blend through miscegenation between unlike organisms, as between the yucca and yucca moth—this is commensality; the third stage is that of voluntary inclusion and exclusion of organisms for the common welfare of the solidarity or for the especial weal of the dominant organism, whether ant or man—this is the stage unwittingly, yet not unhappily, called agriculture.

The lesson of life in Papagueria may easily, and within limits safely, be extended to other regions; for the phenomena and relations are more or less closely paralleled elsewhere. It may appear paradoxical to affirm that it is in arid districts, where agriculture is most arduous, that agriculture began; yet the affirmation is not gainsaid but rather supported by history, and is established beyond reasonable doubt by the evidence of the desert organisms and organizations.

So, whatever its last estate, in its beginning agriculture is the art of the desert.

THE ALGONQUIAN APPELLATIVES OF THE SIOUAN TRIBES OF VIRGINIA*

BY WILLIAM WALLACE TOOKER

The issue, almost simultaneously, of two valuable bulletins from the Bureau of American Ethnology—"The Siouan Tribes of the East," by James Mooney, and "The Archeology of the James and Potomac Valleys," by Gerard Fowke—brings to my desk such a collation of facts, historical, geographical, and archeological, that it enables me to supplement their efforts from another field of research, and at the same time to contribute additional memoranda to the nomenclature of our native races, by presenting analyses of the Algonquian appellatives of these people, whose tribal synonymy, confederacy, and migrations have been carefully discussed by the first, and the archeology of whose territory, from personal researches and excavations, has been the theme of the second.

When Captain John Smith and his companions first discovered the falls of the James river, in May, 1607, the native guides who accompanied the explorers related remarkable stories of a nation living farther up the stream toward the mountains, called the *Monacans*, who, at the time of the falling of the leaf, came down and invaded their country. The fear of these western Indians was such that no inducements the discoverers made could persuade these Powhatans to guide them to the habitations of these people. The stories, however, made so deep an impression upon the minds of the adventurers that in the following spring Captain Smith was assigned to the command of sixty men, in order to discover and to search for the commodities of the *Monacans*, so as to load a ship for home. But so unseasonable was the time and so opposed was the captain of the vessel to load with anything but the "phantastical gold," as it is expressed, which he, as well as others, believed was obtainable among the *Monacans*, that it caused much ill-feeling to

* Read before Section H, American Association for the Advancement of Science, at Springfield, Mass., September 3, 1895.

arise among the colonists; for Captain Smith, having been of a more practical and conservative nature than many of his associates, preferred to load the ship with cedar, which he justly claimed was a more "present dispatch than either durt or the reports of an uncertain discovery." After considerable delay the ship was finally loaded with cedar, and the attempt to discover the country of the *Monacans* was postponed.* In the fall another effort was made, when Captain Newport, with one hundred and twenty men, went forth for the invasion of the unknown country. Arriving at the falls, they marched by land some forty miles in two days and a half, and then returned by the same path. They discovered two towns of the *Monacans*, called *Massinacack* and *Mowhemenchouch*. On their return they were delayed by searching in many places for supposed mines, which was really the object of the expedition, having with them a refiner, who persuaded them to believe that he extracted a small amount of silver from the rock, and, as they relate, better stuff might be had for the digging.†

Smith condenses the information which he subsequently gleaned from the natives as follows: "Vpon the head of the Powhatans [James river] are the *Monacans*, whose chiefe habitation is at *Rasauweak*; vnto whom the *Mowhemenchughes*, the *Musinnacacks*, the *Monahassanughes*, the *Monasickapanoughs*, and other nations pay tributes. Vpon the head of the river of *Toppahanock* [Rappahannock] is a people called *Mannahoacks*. To these are contributors the *Tauxanius*, the *Shackaconias*, the *Ontponeas*, the *Tegminateos*, the *Whonkenteaes*, the *Stegarakes*, the *Hassinnungaes*, and divers others, all confederates with the *Monacans*, though many different in language, and be very barbarous, liuing for the most part of wild beasts and fruits."‡

One of the *Mannahoacks*, belonging to the tribe called the *Hassinnungaes*, whom Smith captured upon the upper waters of the river Rappahannock, when interpreted, said that the *Monacans* were their neighbors and friends, and did dwell, as they, in the hilly countries, by small rivers, living upon roots and fruits, but chiefly by hunting.

This brief summary embraces nearly all the knowledge that we possess relating to these tribes during the period of settlement. After 1609—although undoubtedly often in contact with

* Arber's Smith, p. 106.

† Ibid., p. 438.

‡ Ibid., pp. 366, 367.

the settlers through trade and otherwise—nothing whatever was recorded or preserved relating to them for over sixty years. Even the significations of these tribal appellatives, correct interpretations of which are absolutely necessary for an exhaustive and conclusive study of these people, have been forgotten for many generations.

The questions that now arise, and which I shall endeavor to answer, are these: First, What were the commodities of the *Monacans* that Smith was instructed to search for? Second, What was it that gave rise to lasting impressions in the minds of the Virginia colonists that valuable mines of copper, iron, gold, and silver were to be found in the same region? Third, Can any of the *Mannahocks* be identified with tribes or peoples of a later historic period? Fourth, To what language must we assign these and other names of Captain John Smith?

Mr James Mooney, in his "Siouan Tribes of the East," has ably demonstrated by his synopsis of early historical references, by his identification of the geographical locations of the tribes in after years, and by his conclusions derived therefrom, that the *Monacans* were not the ancestors of the *Tuscaroras*, as has been accepted ever since the time of Jefferson, the sponsor for this baptism, but were the progenitors of those people, who were subsequently, by a fortunate series of circumstances, identified by Horatio Hale as speaking a primitive dialect of the Siouan tongue, thus indicating that the original home of the Siouan family must have been in the east. Therefore it is unnecessary at this time and place to elaborate further on these points that Mr Hale has so learnedly presented from linguistic sources and which Mr Mooney has augmented and confirmed from historical channels, but to accept it as an incontrovertible conclusion that the *Monacans* and their tribal confederacy as such, including the *Mannahocks*, must be assigned to the Siouan linguistic stock.

These truths accepted, I will proceed to analyze those terms, descriptive in their character, which we have found applied to these people in the early days of the period of colonization. These appellatives were bestowed upon them by their neighbors on the east, the Powhatans and their confederates, who are well known to have been a branch of the Algonquian linguistic stock. Therefore there ought to arise no question whatever in the mind of the critical student of Smith's works against the dictum now

submitted, that every one of these terms, without a single exception, are necessarily Algonquian, and consequently should be analyzed and translated by the aid of that language, no matter what the nativity of the people themselves may have been. This declaration will also apply to every aboriginal name occurring upon Smith's map of Virginia, for he was never in contact with other than an Algonquian long enough to learn a name. Besides, the historical evidence would seem to indicate that the greater number of these terms were heard spoken from the lips of the Powhatans long before the colonists saw a *Monacan*. For instance, Captain Newport's guide and interpreter was a savage of Powhatans called *Namontack*.^{*} Newport named a mine six miles above the falls after him because he discovered it.[†] Smith's interpreter while among the *Munnahoacks* was an Algonkin, as was also his *Tockwogh* interpreter while interviewing the *Sasquesahanoughs*. His very brief parley with the *Massawomecks*, as he relates, was entirely by signs.[‡] Therefore it seems to me that failure would be necessarily foreordained in seeking for other than Algonquian elements in any of the aboriginal names of Virginia as bequeathed to us by Captain John Smith.

William Strachey, secretary of the colony, 1609 to 1612, who was more or less familiar with the language of the Powhatans and has left us a valuable vocabulary of that dialect, derives the name *Monacan* from *Monohacan* (or *Monowhawk*), "a sword," § while Heckewelder, through the Delaware, translates it as "a spade or any implement for digging the soil," corrupted from *Monahacan*.|| Heckewelder is so rarely correct in his place-name etymologies that he should have due credit for this suggestion, for the fact appears that both of these authorities are correct in their identification of the verbal element of the name, but not in the grammar, application, or true analysis of the term as applied to a people.

The prefix *Mona* is undoubtedly the verb signifying "to dig," occurring in the same primitive form in many Algonquian dialects, from the Cree *Móona*, in the far north, to the Narragansett *Mona*, on the east, and is reproduced at the south in the Powhatan *Monohacan*, "sword," literally a digging instrument, from

* Arber's Smith, p. 438.

† Strachey, p. 31.

‡ Arber's Smith, p. 422.

§ Mooney, p. 26.

|| Heckewelder's Names, ed. by Reichel, p. 280.

Mono, "to dig," prefixed to *-hacan*, an instrumentive noun suffix used only as a terminal in compound words denotive of things artificial,* so designated because so used by the Indians when purchased from the settlers. The same verb figures in other Powhatan cluster words, thus revealing its identity; for instance, in *Monascunnemū*, "to cleanse the ground to fit it for seed," making it the equivalent of the Narragansett *Monaskūnnemun*; Delaware *Munáskamen*, "to weede." It will be found by analyzing carefully the various synonyms of the term *Monacans*, or *Monanacans*,† with its English plural as displayed, that it resolves itself into the components of *Moná-ack'añough*, from *Mona*, "to dig;" *ack*, "land or earth," with its generic plural of *-añough*, "nation or people"—that is, "people who dig the earth"—the phonetic sounds of which were shortened into *Monacans* by the English, which may be freely and correctly translated as the "diggers or miners." The term as such probably designated the whole confederacy collectively. This abbreviation of the sounds of tribal appellatives is characteristic of English notation, as in *Mohawks*, from *Mauqua'uog*; *Mohegans*, from *Munhigan-euck*; *Pequots*, from *Pequutto'og*, and others.

The "chiefe habitation" of the *Monacans*, according to both Smith and Strachey, was at *Rasaauweak*, or *Rassauek*—a statement that is fully confirmed by analysis of the name. Its earliest notation, however, appears in the Relation of Captain Gabriel Archer,‡ which Professor Arber suggests may be the official report presented by Captain Newport on his first return, in July, 1607, therefore possibly antedating Smith, in the very corrupt form of *Monanacah Rahowacah*, which, to follow Smith, should have been more correctly printed as *Monacanough Rassauek*, thus indicating that there was originally a grammatical continuity between the words as uttered by the savages of the lower James. Frequently the sounds represented by *w* in some of the northern Algonquian dialects is replaced by *r* in the Powhatan and other cognate dialects. Allowing for these alternating sounds, or what Dr Boas terms alternating apperceptions of one and the same sound,§ the derivation of *Rassauek* is probably from *wassau*, "it is bright, it glistens or shines," which, with a suffix applicable to the object described,|| was a term much em-

* Howse Grammar of the Cree, p. 182.

† Smith, p. 2.

‡ Arber's Smith, p. xivi.

§ American Anthropologist, vol. 2, p. 52.

|| Tooker; American Antiquarian, vol. 17, p. 8.

ployed by many Algonquian tribes to designate any kind of white metal or mineral, but which in this case, I believe, for many reasons, was a synonym for mica*—an article of trade and highly valued by the tribes of the west and east, as indicated by its discovery in the mounds of Ohio, in the graves of Virginia, and elsewhere. The terminal affix *-wek* or *-weak* (= Massachusetts *wek* or *week*), "house or home," is the conditional third person singular of the verb—"when (or where) he is at home." Thus we have, in accordance with this analysis, *Moná-ack/añough-wassau-wek*, "the home of the mica diggers," or "home of the people who dig the earth for something bright." Gerard Fowke† informs us: "Several mica mines have been opened within a mile of the court-house [Amelia county]. The miners report that in digging they sometimes discover small piles of mica which have been detached from the rock and heaped together. These pieces, usually of poor quality, as if rejected by the workers, are doubtless from aboriginal excavations, as they lie beneath several feet of accumulated earth, and there is no tradition of early mica mining in this section by the whites."

Although this discovery is not exactly in the direction of *Rassauwek*, as indicated by Smith on his map, it is in the territory of the *Monacans*, and fully confirms the foregoing interpretation, in the fact that mica mining was one of the industries carried on by the early occupants of this valley. The exact site of *Rassauwek* has not been as yet fully established. Smith locates it between the two branches of the river; but Mr Fowke, who has devoted considerable personal attention to the question, says the point of land between the two rivers is irregular, infertile, rather difficult of access, and nothing is found to show that it was ever occupied by the Indians. On the other hand, Elk island, in Goochland county, just below Columbia, bears every indication of Indian occupancy, and many specimens of steatite pottery, some rough, others tolerably well finished, have been found on the island, whereas such are extremely rare elsewhere in the vicinity. From which he concludes: "Altogether it is very probable that the main town of the *Monacans* was on Elk island." But he describes another Indian settlement, farther

* Compare Wóşogolámin', mica, Miemac (Rand), and Wóşéántóehk, glass.

† "Archeologic Investigations," p. 10.

up upon the left bank of the Rivanna, between that river and the James, which corresponds more to Smith's location. While suggesting this may have been the site of *Rassaurek*, he thinks the evidence favors Elk island. Smith's location of tribes out of the horizon of his own researches and explorations must be regarded as approximate only, although the relations of the Indians, which were his sources of information as regards unknown countries, were in the main quite accurate, as later discoveries bore witness. From Mr Fowke's description of the island, it may have been at one time the abiding place of another wing of the confederacy, which the occurrence of steatite vessels would seem to indicate.

This wing of the *Monacans*, the *Monahassanughes*, were noted down by Smith both on his map and in his works. Strachey* places them at the foot of the mountains. It will be observed that we have here precisely the same verbal prefix as in the former term, and it should unquestionably sustain the same derivation of *Mona*, "to dig." Now as to the second component, *-hassan*. In the Massachusetts and in some other dialects *hássun*, *hássin*, or *ássin*, with or without the English aspirate, signifies "a rock," which, together with its generic plural of *-añough*, "people," gives us *Moná-hassun'añough*, "people who dig the rock"—that is to say, they were "miners or quarrymen," which fully describes in a most remarkable way those people who excavated in the steatite or soapstone quarries. Many of these quarries, situated in the valleys and among the hills and forests once occupied by these primitive miners, have been investigated by Mr F. H. Cushing, Mr Gerard Fowke, and others. The accumulated debris of the diggings, the abandoned pot-forms, the fragments of steatite vessels, and the rude digging implements of stone bear witness of aboriginal labor through a long series of years under like conditions. The quarries, especially of Amelia county, studied by Mr Cushing, were of considerable extent, and must have been worked long anterior to the period of colonization—a period from which we must necessarily date its decline.

In *Nahyssan*, of John Lederer, and *Hanohaskie*, of Batt, we find synonyms of *Moná-hassun'añough*, as suggested by Mr Mooney; for the guides and interpreters of both of these travelers were

* History of Travaille, p. 48.

Algonquians or spoke the language, and these were forms undoubtedly current among the settlers and traders in their time.

Farther to the northwest, as laid down on Smith's map and referred to but once in his history, appears another tribe of the *Monacans*, under the appellative of the *Monasukapanoughs* or *Monasickapanoughs*. As is evident to all, we have here displayed another name with the same verbal prefix, as in the other cases, signifying to dig. Surely this confederacy well deserved the title bestowed upon them collectively of being the "diggers." Analysis of this word, as in the previous terms presented, gives us *Mona-sukapan'añough*, "people who dig the *sukapan* or *sickapan*." What is the "*sukapan*"? is the problem that now confronts us. This is comparatively easy of solution, although seemingly difficult at the first glance. The native of *Hassunungue*, when interpreted, stated, among other matters, that the *Monacans* did dwell as they and lived upon roots. The generic name for roots, tubers, or bulbs was *pen*, varying in some dialets to *pun*, *pan*, *pin*, *pon*, or *bun*. Therefore the "*sukapans*" were the tubers of a plant which these barbarous people dug for food and was perhaps their staple product. We, no doubt, find the parallel of "*Sukapan*" in *Sagapon* (or *Sackapun*), a component of a place name on Long Island, New York, in the term *Sagapon'ack*, now applied to a post-office and hamlet in the town of Southampton, from the first syllable of which the village of *Sag Harbor* derives its name. The Micmac (Rand) *Segubun*, "a ground-nut," is another parallel. One of the towns of the *Kuskarawaokes* (later known as the *Nanticokes*), on the eastern shore of the Chesapeake, had the same name. Smith says: * "Here doth inhabite the people of *Sarapinagh* (= ground-nut people), *Nause*, *Arseck*, and *Nantaquack*, the best Marchants of all other Salvages." On Long Island the name was applied to the common ground-nut (*Apios tuberosa*, a leguminous, twining plant, producing clusters of dark purple flowers and having a root tuberous and pleasant to the taste), which are still to be found in great abundance at a swamp in the vicinity known as "*Sagg swamp*." The prefix which denotes the species cannot in all cases be identified, but the generic name with its localizing affix is easily recognizable. Not long since, while in conversation with an intelligent Chippeaway Indian in regard to this particular prefix, he informed me

* Arber's Smith, p. 415.

that it denoted a species which were "hard or difficult to get out of the ground." While the Massachusetts *siogkke*, "hard or difficult," may resemble the Long Island *sagga* (or *sacka*) in sound, I am inclined to believe he was mistaken, and that the Long Island *sagga* and the Powhatan *suka* (or *sicka*) are identical, and are the parallel of the Cree *súgge*, "thick, close together"—a derivation that fully describes the tubers of the *Apios tuberosa*, which grow close together, strung in clusters on a fibrous root. It was probably the same plant discovered by Captain Gosnold on one of the Elizabeth isles, on his visit to the New England coast in 1602, which John Brierton, one of the voyagers, describes as "ground nuts as big as egges, as good as Potatoes, and 40 on a string, not two ynches vnder ground."† Dr J. W. Harshberger, of the University of Pennsylvania, informs me that "*Apios tuberosa*, or, as it is now called, *Apios apios*, by the recent upheaval in systematic names, is a plant of wide distribution and occurs abundantly in Virginia. I have two recorded localities for it—Jamestown and southwestern Virginia—and it is therefore to be found on the upper James." It was undoubtedly the same plant seen by Hariot on the Roanoke,‡ viz: "*Openauk* are a kind of roots of round forme, some of the bignes of walnuts, some far greater, which are found in moist and marish grounds, growing many together, one by another, in ropes, or as thogh they were fastened with a string. Being boiled or sodden, they are a very good meate." Asa Gray, the eminent botanist, said: "Had civilization started in America instead of Asia, our ground-nut would have been the first developed esculent tuber, and would have probably held its place in the first rank along with potatoes and sweet potatoes of later acquisition. Thus the *Mouá-sukapan'añough* were "a people who dig ground-nuts." Compare Otchipwe (Baraga) *Nin Momá apini*, "I dig potatoes." In the historic name of *Saponi*, as applied to a tribe in the annals of Virginia and North Carolina, and as evident by its generic *pon*, we have all that remains of the original appellative, and I believe Mr Mooney (p. 27) is correct in suggesting its derivation therefrom.

The two tribes visited by Captain Newport, and mentioned by Smith as the *Mowhemenchughes* (or *Mowhemenchouch*) and the *Massinacaks*, do not seem to come under the same head as the

* Howse Grammar of the Cree, p. 40.

† Arber's Smith p. 334.

* Narrative, p. 26.

others in being "diggers," although they were confederate or tributary with them. The description of some as being very barbarous, living for the most part on wild beasts and fruits, shows that they were not to any extent agriculturists and furnishes us a clue to the meaning of the term, when divided into its components of *Mowhe-mench'ughes*. The verbal prefix *Mowhe* (or *Mouhe*) in its sounds is identical with the Delaware *mawé*, Narragansett *Mowi* (or *Moiwi*), "to gather," "to bring together," "to pick up," etc. *Mench* is evidently the generic for small fruits or grain, in the plural form, the parallel of the Narragansett *meneash*, Micmac *Menich*, Delaware *Minak*, "fruit or berry," which gives us with its animate plural affix *-uk* (or *-ugh*), *Mowhe-mench'ugh*, "those who gather fruit"—that is to say, they were a hunting people, who lived to a great extent on fruit or wild berries. There is a possibility and I would suggest that in the *Mahoc*, who occupied the territory between the falls of the river and the mountains at the time of Lederer's visit in 1670, were the survivors of the *Mowhe-meuch'ughes* of Smith, and that in the term "*Mahoc*" we find a survival of the Algonquian term for the fruit-pickers.

Massinacack is marked as a king's residence on Smith's map. Strachey says: * "The neerest called *Mowheminke*, the farthest *Massinnacock*, distant one from another fourteen miles." Its other synonyms are *Massinnacaks* † and *Massinacak*. ‡ This term differs from the others in being simply a place-name, showing no action as performed by a verb as displayed in the previous interpretations and as evidenced by its locative termination. As to its analysis, I would suggest that *m'* is the impersonal particle, *assin*, "stones," which, with its substantival *ac* and locative suffix *ak* (= Narragansett *auk-it*, Massachusetts *ohkit*, Delaware *hacking*), gives us *M'assin-ac-ak*, "at the place of stones." It is quite possible that it may refer to the "pyramid of stones" which John Lederer observed in 1670 near the village of Monacan, ten days' travel above the falls. He was told that it represented the number of a colony which left a neighboring country because of overpopulation, a condition easily reached among hunting tribes. The emigrants, having been chosen by lot, had come to the present location under the leadership of a chief called *Monack*, from whom they derived the name of *Monacan*. Mr Mooney comments on

* Hist. of Gravelle, p. 131.

† Smith, p. 71.

‡ Ibid., p. 438.

this statement: * "As the explorer stopped with them only long enough to learn the road to the next tribe, his version of their migration legend must be taken with due allowance." This pyramid of stones was probably erected for reasons similar to that mentioned in the patent for Livingston Manor, New York, dated November 4, 1684: † "Place called by the natives *Wawanaquassick* (or, better [pp. 696, 697], *Mawanaquassick* = place where stones are gathered together), where the heaps of stones lye . . . the said heaps of stones upon which the Indians throw on another as they passe by from an ancient custom among them."

The *Mannahock* or *Mannahoack* confederacy consisted of perhaps a dozen tribes, of which the names of the principal eight have been preserved, although only four of them are shown on Smith's map. Smith's own acquaintance with them seems to have been limited to an encounter with a large hunting party in 1608. Smith, however, was a man who knew how to improve an opportunity; and having the good fortune to take one of the *Hassinnungues* prisoner, he managed to get from him, by the aid of his guide and interpreter *Mosco*, a very fair idea of the tribes and territories of the confederacy, their alliances and warfare, their manner of living, and their cosmogony, and succeeded before his departure in arranging a precarious peace between them and their hereditary enemies, the Powhatan confederacy.

Smith's interpreter on this occasion was a savage of *Wighcomoco*, at the mouth of the Potomac river, and the names of these *Mannahock* tribes are of his rendering, and, as the fact appears, are Algonquian interpretations of Siouan names. *Mannahock*, however, is an exception, and is evidently his descriptive term for the whole of these people collectively and did not indicate a separate tribe. I would suggest its analysis from the indefinite particle *m'* prefixed to the verbal radical *an*, "to be more than," "to surpass," united to the verb *hahânu* or *ahânu*, "he laughs;" *ahânuock*, "they are merry;" or, as the term would be rendered in the Massachusetts or Narragansett, *M'an-ahânuock*, "they are very merry, or a very merry people." The verbal root is probably imitative. Smith remarks, in striking confirmation of this derivation: ‡ "And so we left foure or five hundred of our merry *Mannahocks* singing, dancing, and making

* Siouan Tribes, p. 29.

† Doc't Hist. N. Y., vol. 3, p. 624.

‡ Arber's Smith, p. 429.

merry." Dr Hale remarks of Nikonha, from whom he discovered the Siouan affinity of the Tutelos:* "A wrinkled, smiling countenance. Not only in physiognomy, but also in demeanor and character, he differed strikingly from the grave and composed Iroquois among whom he dwelt. The lively, mirthful disposition of his race survived in full force in its latest member. His replies to our inquiries were intermingled with many jocose remarks and much good-humored laughter." In a verity, his portrait shows all these characteristics of his race, which, together with the translation of their Algonquian appellation, is collateral evidence as to the Siouan affinity of some of these tribes.

There is but little known as to the tribes of this confederacy. The pressure of the cruel Iroquois on the north and the advancement of civilization on the east probably compelled them to migrate early to the southward; therefore I shall devote but a few words to the less interesting. The savage whom Smith captured said that † "he and all with him were of *Hassininga*, where there are three kings more, like unto them, namely, the king of *Stegora*, the king of *Tauxuntania*, and the king of *Shukahonia*, that were come to *Mohaskahod*, which is onely a hunting town." These are the four tribes marked on Smith's map; consequently must have been considered the most important.

The *Hassinnungaes* or *Hassinuga* is derived from *hassun*, "a rock;" *wónogk*, "hole or den," which, with the terminal of the animate plural, denotes "those who dwelt in caves or holes of the rocks," thus indicating a low state of barbarism, as Smith truthfully observes. Its equivalent is found in the Massachusetts *Hassunnegk*, "cave" (Eliot), Gen. 29: 7, 17; *Hassunonogqut*, "holes of the rocks," Jer. 16: 16. A number of these caves, once inhabited by red-men, have been discovered in Virginia. William H. Holmes ‡ describes one of these typical rock-shelters, situated in Harrison county, due west from the home of this tribe. (Strachey, however, states that they lived farther west than Smith locates them.) This shelter displayed on its rear wall some interesting petroglyphs, and in the debris of its floor were found potsherds, arrow points, paint-stones, and other objects, both natural and artificial. Professor H. C. Mercer, of the University of Pennsylvania, has explored many of these rock-

* Tutelo Tribe and Language, p. 9.

‡ American Anthropologist, vol. 3, p. 217.

† Arber's Smith, p. 427.

shelters of Virginia, which showed no great antiquity—in fact, he was astonished by the comparatively modern evidence of their occupancy by the red-men.

The *Stegarakies* or *Stegoras* (= *stegan-ak'anoughs*) survived as the *Stenkenocks*, as mentioned by Governor Spotswood, in 1711, as one of the tribes living near Fort Christanna, in Virginia, which the colonial government desired to secure from the further attacks of the Iroquois.* This name is undoubtedly Algonquian, as its terminal indicates, but so far I have been unable to identify its prefix.

The *Tauxanies*, *Tunxsintania*, or *Tauxuntania* were probably those mentioned by Lederer as the *Nuntaneuck*, speaking the same language as the *Monacan*, *Nahyssan*, *Saponi*, and others. This term in one form, *Tauxanies* (= *Taux-anoughs*), seems to denote a "people of a short stature;" Powhatan *Taux* or *Tank*, "small, little;" Delaware *Tangitto*, "short, small," while its longer forms seem to contain the radical *-itan*, "a flowing stream or river;" hence *Taux-itan'anoughs*, "people of the little rivers," as referred to by Smith.

The *Shakahonia* or *Shackaconias* were "the stone people;" *Shacahocan-añoughs*, Powhatan, [Strachey] *Shacahocan*, [Smith] *Shacquohecan*, "stone." This meaning as rendered by these two authorities is not the literal one, for its instrumentive generic suffix *-hocan* indicates something artificial.† It denoted possibly a stone prepared for slinging, tossing, or rolling, according to the meaning of its prefix *shacka* or *shacquo-*, which I have not been able to identify to my satisfaction. In the name *Shoccories* of Lederer and Lawson we find probably its synonym of a later period. They were living in close proximity to the *Occaneeches* and *Enos*. Possibly the latter were but another village of the *Shoccories* when visited by Lederer, as they were only fourteen miles apart, with the same customs. They were devoted to an athletic game, described by Lederer in 1672 as "slinging of stones;" and in 1701, when seen by Lawson, the two tribes were united, and had not forgotten their old game mentioned by Lederer, which may be recognized as the universal wheel-and-stick game of the eastern and southern tribes; for Lawson says in his narrative they were much addicted to a sport they call *chenco*, which is carried on with a staff and bowl made of stone, which

* Mooney, p. 21.

† Howse's Grammar of the Cree, p. 182.

they trundle upon a smooth place, like a bowling green, made for the purpose.*

The *Ontponeas* (= *Ont pon'anoughs*) were another "people of roots or tubers," as shown by its generic *pon*. The species indicated by its prefix *ont* I have been unable to identify. It was probably but another descriptive term for the *sagapon*, for Strachey gives us *Ouh-punnawk*, "a ground-nut." The *Meipontskey* of Governor Spotswood, who in 1722 were living, under the protection of the English, near Fort Christanna, were probably a remnant of these people.†

The *Tegninateos* or *Tegoneas*, as Smith varies their name, are but briefly mentioned. They were probably a people dwelling at that time far off in the mountains or, as Smith remarks, "in the hilly countries." The name evidently contains the Algonquian element *-atin*, "hill or mountain," and the terminal of *-añough* or *-añies*, "people." The prefix *Tegni* or *Tego* is seemingly from the same verbal root as the Narragansett *tagu*, "to go up," and possibly related to the Massachusetts *tohko*, "to climb;" hence *Tego-atin'anoughs*, people who climb the mountains, or "the mountaineers," as we might put it. It is quite possible that the *Toteras* or *Toleras*, who are represented in Batt's manuscripts ‡ as a "mountain tribe," were the descendants of this nation.

The *Whonkentyaes* or *Whonkenteas* are another tribe of the *Manahocks*, or tributary to them, who are unplaced on Smith's map. The phonetic sounds of this appellative suggests that they were probably the ancestors of the *Akenatzies*, or *Occaneeches*, as it is varied, who were living, as Mr Mooney has indicated, on an island just below the confluence of the rivers Dan and Staunton, in Mecklenburg county, Virginia, when visited by John Lederer in 1670. I would suggest that the derivation of the term *Whonkenté-us* or *Whon-kenchi-aneas* as from the Narragansett *awâun*, Massachusetts *auwon*, "there is somebody," i. e., who is strange or different from those speaking. § The second component, *-kentie*, *-kenatzie*, or *-caneche*, seems to have its parallel in various forms of the verb "to talk" or "to speak," as in the Long Island *un-kenchie*, "the strange talker;" Narragansett *awâun-ken'taunchem* ? "Who are you that discourses?" Delaware *n'iechsin*, "to speak;" Powhatan *kekaten*, "you tell," which, with its terminal, gives us

* Mooney, p. 63.

† Ibid., p. 37.

‡ Col. Hist. N. Y., vol. 3, p. 194.

§ See Trumbull's *Algonkin Names for Man*, p. 14.

whon-kentie-añies, "people of a strange talk, or another speech." This analysis confirms Smith's statement that the *Mannahocks* were "many different in language." Again, in noticeable corroboration of this derivation, the *Occaneeches* seem to have been of a different linguistic stock to their Siouan neighbors. Mr Horatio Hale, quoting the Virginia historian, Beverley, says: * "The general language here used is that of the *Occaneeches*, though they have been but a small nation ever since those parts were known to the English; but in what their language may differ from that of the Algonkins I am not able to determine. Further on he [Beverley] gives us the still more surprising information that this general language was used by the priests and conjurers of the different Virginia nations in performing their religious ceremonies in the same manner [he observes] as the Catholics of all nations do their mass in Latin." Now, it appears to me, on careful consideration of this statement of Beverley's in all its aspects, that it is open to only one construction—that is to say, if the term *Whonkenties* is a translation by an Algonquian interpreter of a Siouan description of a nation of another or different speech, residing among and tributary to them, and is also, as I suggest, a synonym for *Occaneeche* or *Akenatzie*, it would surely lead us to infer that the language of the *Occaneeches* was not Siouan, but was really nothing more nor less than a dialect of the Algonquian. It is evident that traders living in the English settlements, closely associated with the Powhatan Indians and employing them as guides, would not be likely to speak other than their language in bartering with the outlying tribes.

So far as the religion of the Virginia Indians is concerned, Mr Mooney observes: † "Lederer's account of their religion is too general to be definite, and he neglects to state to what particular tribal language the Indian names belong." In answer to this observation, I would remark, all that is necessary in order to identify the language to which these names belong is to compare Lederer's narration with that of Captain John Smith. Lederer says: ‡ "They worship one God, creator of all things, whom they call *Okaeð*, others *Munnith* (= Narragansett *Manit*); to him alone the high priest, or *Periku*, offers sacrifice, and yet they believe he has no regard for sublunary affairs, but commits the

* Tutelo Tribe and Language, p. 12.

‡ Discoveries, p. 11.

† Siouan Tribes of the East, p. 33.

government of mankind to lesser deities, as *Quiacosough* and *Tagkanyough*—that is, good and evil spirits. To these, inferior priests pay their devotion and sacrifice, at which they make recitals to a lamentable tune of the great things done by their ancestors."

On the other hand, Smith says: * "This sacrifice they held to be so necessary that if they should omit it their *Okee*, or devel, and all their other *Quiyoughcosughes*, which are their other gods," etc. The term *Okee* of these two early authorities is undoubtedly related to the Massachusetts *Ohke*, "earth," the passive inanimate producer; *Ok-as*, the passive animate producer or agent of production.† Spelman‡ calls this god *Cakeres*, seemingly a variation; related also to the Delaware "*Kickeron*, who is the original of all, who has not only once produced or made all things, but produces every day," which Dr Brinton terms the eternally active, hidden part of the universe.§ Hence Smith may have been in error in assigning to the god *Okee* the attributes of his satanic majesty—a god whom Lederer more correctly termed "the creator of all things." In addition, Smith in his brief vocabulary gives us *Okee*, "gods;" *Quiyoughcosughes*, "pettie gods and their affinities." The latter term, as well as Lederer's two, with the terminal in *-osough*, is what Howse|| terms the form of the adjective animate verb (= Massachusetts *-ussu*; *Naragansett -êsu*; *Cree, -issu*, "he is or it is"). Hence we have *Quiyoughcosough*, "he is lesser or little," which may be related to the Massachusetts *Oggusussu*, "it is lesser or little." To this god the Powhatans offered yearly a sacrifice of children.¶ *Tagkanyough* (= *Tackan-issu*), "he is of the wilderness," "god of the forest." This agreement of Smith and Lederer, together with the analysis of the names, proves beyond question that the general language used by the Virginia tribes in their religion, and in their intercourse with alien tribes, must have been necessarily Algonquian. The fact that Beverley, as he remarks, was unable to determine the difference between the language of the *Occaneeches* and that of the *Algonkins* would indicate to my mind

* Arber's Smith, pp. 78, 374.

† See Trumbull's Notes 49, 50, Narr. Club, ed. R. Williams Key.

‡ Arber's Smith, p. cv.

§ Lenapé and their Legends, p. 133.

|| Grammar of the Cree, p. 25.

¶ Smith, p. 375.

that they were practically identical, with only an archaic difference—a difference similar to that mentioned by Mr Mooney as existing between the Cherokee language and that used in the sacred formulas of their shamans. Mr Mooney says: * “They are full of archaic and figurative expressions, many of which are unintelligible to the common people and some of which even the shamans themselves are now unable to explain. These archaic forms, like the old words used by our poets, lend a peculiar beauty which can hardly be rendered in a translation. They frequently throw light on the dialectic evolution of the language, as many words found now only in the nearly extinct Lower Cherokee dialect occur in the formulas which in other respects are written in the Middle or Upper dialect.” These archaic traits have been observed by Hale,† Cushing,‡ Matthews,§ and by other explorers into the secret rites of tribes of other linguistic stocks; and all things being taken into consideration, this solution of the *Occaneeche* problem is open to fewer objections than to accept the unlikely supposition that the Algonquian tribes of Virginia used the Siouan language in their religious ceremonies.

It is perhaps needless for me to observe, after the foregoing presentation of the points under discussion, that the questions as to what were the commodities of the *Monacans* and what gave rise to thoughts of mines, as well as questions third and fourth, have been fully answered. The fact that a partial knowledge by the colonists of the language of the Powhatans, acquired during the first few months of the settlement, gave them but an insufficient idea as to what the *Monacans* dug from the earth, and as their knowledge increased and they became more familiar with the language, habits, and customs of the natives, they learned that the *Monacans* mined absolutely nothing desirable. As time grew apace, the truth soon dawned upon their minds that the necessities of life were more preferable than the phantom gold and other will-o'-wisps of an unknown country, and as these prime essentials were procurable from the industrious native agriculturists nearer home, to this food-quest, more than to any other, was the remainder of Smith's stay in the colony devoted.

* Seventh Annual Report of the Bureau of Ethnology, p. 343.

† Iroquois Book of Rites, p. 46.

‡ Second Annual Report of the Bureau of Ethnology, p. 12.

§ Fifth Annual Report of the Bureau of Ethnology, p. 456.

UPPER ORINOCO VOCABULARIES

BY A. ERNST

I obtained lately a manuscript copy of the vocabularies of some languages spoken on the Upper Orinoco and its affluents which had been collected by Mr F. Montolieu, a Frenchman, who for several years acted first as secretary to the governor of the Venezuelan territory Amazonas and was finally governor himself (1870 to 1876). The manuscript contains a vocabulary of each of the following languages: Baniva, Barré, Yavitero, Puinabo, Tupi, and Piaroa. Montolieu began publishing them in a Caracas newspaper, *El Tiempo* (July, 1877), and this part was afterwards inserted in the eighth volume of the *Bibliothèque linguistique américaine* (Paris, 1882), pages 274 to 280; but this comprises only the Baniva, Barré, and the first half of the Yavitero (as far as letter H). The rest was never printed, and I have thought, therefore, it would be of some interest to publish the remainder of the Yavitero, together with the Puinabo and Piaroa, languages which still today are very imperfectly known.

The pronunciation is Spanish; *eu* is to sound as in French, when written without a diæresis.

I. YAVITERO.

- Lagartijo (lizard), *cuito*.
- Laolao (a species of fish, of the genus *Silurus*), *mucurí*.
- Lapa (*Cœlogenys paca*), *iafa*.
- Laurel (laurel), *caguizi*.
- Lavando (washing), *fji-fja*.
- Lejos (far), *te ie*.
- León (puma, *Felis concolor*), *eguüne, eguane*.
- Llévale (take him, conduct him), *fila gnata-ié*.
- Loro (parrot), *curicuri*.
- Luz (light), *camonajadi*.
- Madera (wood), *cagueraná*.
- Malo (bad), *curiciji*.
- Mama (he sucks), *yua*.
- Mañana (tomorrow), *iosinasita*.

- Mandioca (cassava plant, *Manihot utilissima*), *machoca*.
 Mapanare (a snake of the genus *Lachesis*), *maniplré*.
 Mato (a large lizard, of the genus *Tejus*), *iafatoto*.
 Media noche (midnight), *fasiyasinari*.
 Menor (younger son), *cadía*.
 Mercancias (merchandise), *caguarci*.
 Mono (monkey), *püaché*.
 Mono blanco (a species of monkey, perhaps *Midas ædipus*), *agutúmi*.
 Mono chucuto (another species of monkey, genus *Brachyurus*), *caroirí*.
 Monte (forest), *agüajo*.
 Moriche (*Mauritia flexuosa*, a palm), *teguí*.
 Morrocoy (*Testudo tabulata*, a land-turtle), *curia*.
 Muchacho (boy), *macicu-io* (sic!).
 Muchachos (boys), *macicu-io* (sic!).
 Mujer, mi (my wife), *no-jízo*.
 Mujeres, las (the women), *sarii-nai-femí*.
 Negro (black), *momoni*.
 Nieto (grandchild), *no-ia*.
 Onoto (arnatto, *Bixa orellana*), *oio-maja*.
 Oye (hear!), *mesijejatejari*.
 Paga (pay), *fide-üena*.
 Paja (straw), *ieguarí*.
 Palo (tree), *ata*.
 Paloma (pigeon), *onoca*.
 Papá (father), *nafo*. = *my father*
 Para ti (for thee), *fi-ié*.
 Paraguatán (a tree, *Macrocnemum tinctorium*), *cafisaná*.
 Pared (wall), *yaini*.
 Pasado mañana (day after tomorrow), *iasanasajiti*.
 Pasear à tu casa (to walk to thy house), *monita fíjoi*.
 Paují (a genus of birds, *Crax*), *zoita*.
 Paují copete (*Crax daubentoni*), *damoco*.
 Paují roncador (another species), *itirí*.
 Pava (turkey-hen), *io-cuimani*.
 Pavon (a fish, *Cichla orinocensis*), *cuna*.
 Pequeño (small), *juchijí*, *guichasiája*.
 Pereza (sloth), *cia-mo*.
 Perico (small parrot), *querequere*.

- Perro (dog), *maidi*.
 Pez (fish), *jimaa*.
 Piapopo (a bird of the genus *Rhamphastos*), *iocüe*.
 Picure (a rodent, a species of *Dasypsecta*), *gua-ioto*.
 Pijigua (a palm, *Guilielma speciosa*), *macicuyo*.
 -Pintado (painted), *sorimení*.
 Plátano (plantain, *Musa paradisiaca*), *faratana* (Span.).
 -Plato (plate), *farato* (Span.).
 Playa (beach, bank of river), *cajasina*.
 Poco (little), *juchisimajá*.
 Porque (because), *fena*.
 Principal horcon (main post of hut), *fotafí*.
 Puerta (door), *guaisí*.
 Puntada de cabeza (head ache), *caguinocifo*.
 Quiero (I will), *nujateje*.
 No quiero (I will not), *fata-nujenaneñí*.
 Yo te quiero (I love you), *nutateja*.
 Qué quieres? (what do you want?), *mesijejatearí*.
 Rata (rat), *marijénajalí*.
 Ratón (mouse), *atamo*, *acamora*.
 Raya (a fish, *Trygon hystrix*), *yajique*.
 Rayado (another fish, *Platystoma fasciatum*), *corití*.
 Regalo, te (I make you a present of . . .), *noregarafí*.
 Regalo (a present I make to you), *ie-vale*.
 -Sal (salt), *io-quira*.
 Salvaje (savage), *caiegua*.
 -Sapo (toad), *tororo*.
 Seje (a palm, *Enocarpus bataua*), *i-aií*.
 Seje chiquito (another palm), *cofelí*.
 Tapir (*Tapirus americanus*), *maciciti*.
 Temblador (electric eel, *Gymnotus*), *samai*.
 Tengo, no para tí (I have not for you), *fatafima*.
 Terecay (a species of river-turtle, *Peltecephalus tracaxa*),
 sifori.
 Tienes (thou hast), *mesimari*.
 Tigre (*Felis onça*) *cuadigua-minarí*.
 Tierra (earth), *cujachí*.
 Tijeras (scissors), *fezi*.
 Tinaja (earthen water-vessel), *quanana*.
 Titi (a monkey, *Chrysotrith sciurea*), *richéce*.
 Totuma (calabash), *acuasi*.

- Tráeme (bring me), *fitagutane, fífatune*.
 Tragavenado (Boa constrictor), *zorema*.
 Vámonos (let us go), *üasavaüa*.
 Vamos á dormir (let us sleep), *chima üisaüa*.
 Vas (you go), *üisajatai-a*.
 Váquira (Dicotyles ~~torquatus~~), *afíjia*.
 Venado (deer, Cervus sp.), *mataji-o*.
 Véndeme (sell me), *füendené* (Span. ?).
 Vengo (I come), *no-íofiviuta*.
 Verde (green), *sífolemi*.
 Viudita (a monkey, Callithrix torquata), *guacui*.
 Voy (I go), *nusafisaji*.
 Voy á hacer (I am going to do), *nomafíifíji*.
 Vuelvo (I return), *no-io*.
 Yema (egg), *inecinaja*.
 Zorro (fox), *inarito*.

The Yavitero has many affinities with the Baniva, as pointed out already by Martius, who reprinted a short vocabulary of it collected by Wallace (Wörterammlung, pp. 261, 262). Montolieu likewise called it a dialect of the Baniva, saying that it differs from the latter principally by the frequent use of the sound *F* in order to form diæresis. The first part of his vocabulary may be found in volume 8 of the *Bibliothèque linguistique américaine*, pages 281 to 284, and this being arranged in Spanish and Yavitero, I have followed the same system, but added to every word its meaning in English and also the scientific names of animals and plants, as far as these are known to me. It is unfortunate that Montolieu appeared to have no idea of which words are most important in making a vocabulary so as to render it useful for ethnographical classification. We may be thankful, however, for what he did.

II. PUINABO.

- Agua (water), *eut* (*eu* like *ö*, but very short).
 Ahora (now), *da-jo-mat*.
 Algodón (cotton), *dé-ju él*.
 Anzuelo (fish-hook), *ma-píju*.
 Aquí está (here is), *nan*.
 Araguato (howling monkey), *ca*.
 Así será (well), *jo-teya*.

- A ver (let me see), *eglé*.
Barbasco (plant for poisoning fish), *mau*.
Beber (to drink), *bi-vü-ak*.
Bejuco (climbing plant), *i-o*.
Bonito (pretty), *de-jei*.
Buenos dias (good day!), *am-bije-nuk*.
Caña (cane), *chu-chin*.
Caro (dear), *am-bí-bajé*.
•Casa (house), *mo*.
Cazabe (cassaba bread), *an*.
Cerro (mountain), *ijel*.
Comer (to eat), *acom*.
Cómo te llamas? (what is your name?), *bamatan*.
Cómprame (buy), *ba-jin-ci-un*.
•Cuentas (beads), *ni-c-gap*.
Dame (give me), *acubugan*.
Dividamos (let us divide), *doma*.
Dormir (to sleep), *sogle*.
Está bien (it is well), *ejei*.
Fuego (fire), *deu* (*eu = ö*).
•Hombre (man), *no-si-unté*.
Gracias (thanks), *op*.
Grulla (crane), *tuli*.
Lejos (far), *aijopec*.
Maiz (Indian corn), *cojon*.
Malo (bad), *ejep*.
Mandioca (cassava plant), *masaca*.
Mono (monkey), *cho-o*.
Morrocoy (land-turtle), *i-jue*.
•Mujer (woman), *nosomi-ao*.
•No (not), *bai-rut*.
•Pájaro (bird), *sü-ip*.
Pescado (fish), *yoi*.
Pescado pilado (fish, dried and pounded), *uma*.
Piña (pine-apple), *ijai*.
•Plumas (feathers), *sü-ip*.
Plátano (plantain), *t-ta*.
Qué es esto? (what is this?), *indé*.
Te quiero (I love you), *manté*.
Rallo (cassava-grinder), *el-t*.
Rayado (a fish, *Platystoma fasciatum*), *ijen*.

Sombrero (hat), *u-ipé*.

Tabaco (tobacco), *jeup*.

Tengo hambre (I am hungry), *am-üi-ric*.

Tú (thou, you), *mam*.

Vagre (a species of fish, *Platystoma*), *muná*.

Vámonos (let us go), *venoc*.

Vámos á beber yucuta (let us drink yucuta), *am-bon-de-oc*.

Vámos á dormir aquí (let us sleep here), *vi-oi-en*.

Ven acá! (come here!), *nain vai-uc*.

Vénde me! (sell me!), *a-jin-ci-un*.

Ya está! (it is done), *ní-ega-dé*.

Yo (I), *am*.

Zarza (sarsaparilla), *ju-it, tan-peup*.

One, *jai-tun*.

Two, *jaca-jo*.

Three, *jai-pai*.

Four, *jaca-junue*.

Five, *nap-tan*.

The *Puinavis* dwell on the Inírida, an affluent of the Guaviare. Their language appears to be without affinities (Brinton, *American Race*, 278). A vocabulary of fifty-three words, as collected by Crévaux, is published in volume eight of the *Bibliothèque linguistique américaine* (Paris, 1882), pages 255 and 256. Montolieu's vocabulary contains some sixty words, no more than twelve of which are to be found also in the list formed by Crévaux, viz. :

	MONTOLIEU.	CRÉVAUX.
1. Water	<i>eut</i> ,	<i>u, eti</i> .
2. To drink	<i>bi-vü-ak</i> ,	<i>u asioua</i> (I drink water).
3. To eat	<i>acom</i> ,	<i>aynoc</i> .
4. Maize	<i>co-jon</i> ,	<i>cana</i> .
5. Plantain	<i>t-ta</i> ,	<i>saoua</i> .
6. Let us go.	<i>ve-noc</i> ,	<i>bino</i> .
7. Come here	<i>nain-vai-uc</i> ,	<i>maiounani arica</i> .
8. One	<i>jai-tun</i> ,	<i>un, utam</i> .
9. Two	<i>jaca-jo</i> ,	<i>acao</i> .
10. Three	<i>jai-pai</i> ,	<i>apoui</i> .
11. Four	<i>jaca-junue</i> ,	<i>acaouno</i> .
12. Five	<i>nap-tan</i> ,	<i>daptan</i> .

Of these numbers 1, 6, 7, and the five numerals are evidently the same, with slight phonetic changes.

III. PIAROA.

The Piaroas dwell on the mouth of the Mataveni, an affluent on the left bank of the Orinoco. Their language appears to be unconnected with any other stock (Brinton, *American Race*, 266). Dr Crévaux collected a short vocabulary of thirty-seven words, which is published in the eighth volume of the *Bibliothèque linguistique américaine* (Paris, 1882), pages 257 and 258. A more extensive vocabulary was formed by Chaffanjon and inserted in his *L'Orénoque et le Caura* (Paris, 1889), pages 324 to 326. The following list, made by Montolieu, contains some additions to both. The corresponding words from Crévaux and Chaffanjon I have distinguished by the initials Cr. and Ch.

- Ají (Capsicum), *abúa* ; *erate*, Ch.
- Anzuelo (fishing hook), *anfuaté* ; *awache*, Ch.
- Araña mono (a large spider, *Avicularia blondi*), *ajuca*.
- Bien (well), *adigua* ; *adiba*, Cr. ; *adigua*, Ch.
- Cabuya (string), *uaraté-zapa*.
- Café (coffee), *aijá* ; *cawe*, Ch.
- Camarada (comrade), *camarada* (Spanish).
- Canalete (oar), *uadé* ; *guaiguade*, Ch.
- Camisa (shirt), *puñutá* ; *asca hisata*, Ch.
- Candela (fire), *ufcú* ; *huskuk*, Ch. ; *ocoura*, Cr.
- Canto de guerrá (war song), *nanaja*.
- Caño (branch of a river), *aje*.
- Caña dulce (sugar cane), *majá* ; *naha*, Ch.
- Casaba (cassava bread), *inichi* ; *ynisi*, Ch.
- Cebucan (cassava-press), *añ-na*.
- Cerro (mountain), *muijaca* ; *ynagua*, Ch.
- Conversar (to talk), *tryata*.
- Copahiba (copaiva), *guaipa*.
- .. Cuchillo (knife), *nauadé* ; *naguade*, Ch.
- .. Curare (curare, arrow-poison), *manana* ; *maeneme*, Ch.
- Dame (give me), *jít-t*.
- Diablo (devil), *anfu-etisa*.
- Dia (day), *monó* ; *morho* (sun), Ch.
- Donde (where), *ten-né*.
- No entiendo (I do not understand), *enucu-acuесе*.
- Escopeta (gun), *culupa* ; *cuhupe*, Ch. (Span. *chopo*).
- Escucho (I listen), *enucu* (= I understand).

- Espejo (looking-glass), *tejatoba* ; *tijata*, Ch.
- Feo (ugly), *suraja*.
- Hablo (I speak), *jucua-cua*.
- Hablas (you speak), *jucua-ta*.
- Hombre (man), *jumeto* ; *ovo*, Ch.
- Grande (large), *eninajé* ; *buio*, Ch.
- Luna (moon), *camuja* ; *chawa*, Ch.
- Machete (cutlas), *ureda* ; *curoode*, Ch.
- Maduro (ripe), *itzu*.
- Malo (bad), *chura* ; *suraa hiso* (very bad), Ch.
- Marima (the inner bark of a species of *Lecythis*, used as cloth), *duta*.
- Mujer (woman), *naté* ; *isaho*, Ch.
- Niña (girl), *pujate* ; *chistiho*, Ch.
- Noche (night), *iodó*.
- Nosotros (we), *u-uoto*.
- Oro (gold), *corao*.
- Pequeño (small), *piquin-dian* ; *ykiu*, Ch.
- Periquito (a small parrot), *muéké*.
- Piapoco (a bird, *Rhamphastos* sp.), *pubi*.
- Plátano (plantain), *baruru* ; *paruro*, Ch.
- Puerto (port, landing), *tabuuru*.
- Rio (river), *paragua*.
- Ron (rum), *niña-ja-ia* (*ahíia*, water, Cr.).
- Sol (sun), *mono canuja* ; *morho*, Ch.
- Sombrero (hat), *cadi-uca* ; *kyuhak*, Ch.
- Tabaco (tobacco), *ja-jet-né* ; *halé*, Cr. ; *haatei*, Ch.
- Tinaja (water-vessel), *cañári*.
- Totuma (calabash), *baraj* ; *mukiriba*, Ch. ; *mourica*, Cr.
- Tú (thou, you), *u-cu*.
- Véndeme (sell me), *i-it*.
- Vosotros (you, pl.), *u-cutu*.
- Yeso blanco (white plaster, gypsum), *eréilaca*.
- Yo (I), *T-ten*.

SOME PHRASES.

- Vamos á dormir (let us go to sleep), *peneta-já*.
- Vamos á comer (let us eat), *chiratucua* ; *chuscua* (to eat), Ch.*
- Vámonos (let us go), *taratimua*.
- Ven acá (come here!), *ichi-ua* ; *thivaa*, Ch.

* Cfr. the Chibcha *bsoscua*, to eat.

NUMERALS.

- 1, *nanté*.
 - 2, *tajo*.
 - 3, *uameta*.
 - 4, *imuté*.
 - 5, *imoterua*.
 - 6, *caramuté nanté* (5 + 1).
 - 7, *caramuté tajo* (5 + 2).
 - 8, *caramuté uameta* (5 + 3).
 - 9, *tanmoredué*.
 - 10, *tanmoredé*.
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CLAY FIGURES FOUND IN GUATEMALA

BY P. J. J. VALENTINI

The last Quarterly of Publications of the Royal Ethnologic Museum, Berlin, volume IV, 1, contains the result of certain explorations made by Dr Ch. Lapper in the Central American provinces of Chiapas and Guatemala. The traveler calls attention to the vast amount of hitherto unknown Indian settlements lying in ruins on that ancient culture-ground. Although devoid of the architectural grandeur and the sculptural finish exhibited in the palatial ruins of Chichen Itza, Copan, and Palenque, the author says that they nevertheless must not be overlooked by future explorers. At the slightest scraping of the surface they yielded a crop of interesting relics, principally of pottery, and when viewed as a whole they revealed the fact that in culture the people seem not to have been so absolutely dependent on those larger centers as was believed; for each of the now collapsed group of structures still exhibits that main feature of worship, the sacrificial tumulus with its platform on top and steep staircases subtending often an angle of eighty degrees. In plan, however, the construction appears to conform to their more sumptuous models, the precincts and the oblong edifices enclosing inner yards, and these yards lying deeper than the common level. Dr Lapper found no mortar employed either in the slabs that covered the tumuli or in such walls as were built to fortify the places and to make them inaccessible to the enemy. The explorer cites not less than seventy-one of such places, extending from central Chiapas to the confines of Honduras and Guatemala. They are shown on a chart, and views and measurements of twenty of them also illustrate the text. Those shown on plan 20, representing the ruins of Socabaja (department of Quiche, Guatemala), are reported by Dr Lapper as of larger extent and of more interest than all the others he succeeded in exploring.

One part of the pottery collected on this tour was presented by the explorer to the Berlin Ethnologic Museum, and carefully described and commented upon by Dr Ed. Seler, the curator of

the American department, in sequence to Dr Lapper's article, pages 21-53. Dr Seler's text, as usual, is full of additional historical information and of suggestive generalizations, proving again how much he is at home in a district more than three thousand miles distant from his own.

Among the one hundred and four illustrations given three attracted our special attention. They represent figures of clay, pertaining to the Sarg collection, which was made on the ground explored by Dr Lapper, and which are quoted for the purpose of certain comparisons. We regret that Dr Seler should not have dwelt a little longer on these curious specimens; possibly he abstained because they have been discussed elsewhere, a fact, however, which has not come to our knowledge. We reproduce those specimens in Figs. I, II, and III, adding thereto a few remarks.

Although the specimens were acquired in Coban (Verapaz), we doubt if they were the product of the tribe of Indians living in this department. They seem to us to be imported. They are of an execution too nice, too individual, quite too artistic, and deviate too much from the conventional pattern exhibited in the pottery manufactured by the Indians of the Guatemala-Altos to be modeled by their hands. Judging from the features of Fig. III, it is evident that this head is not that of an Indian; it shows neither the characteristics of prominent cheek-bones nor the usual decoration of plumed head-dress and earrings. We believe it to be the portrait of a Spaniard—the faithful reproduction of the visage of one of those stern and haughty "capitanes" who mercilessly made themselves masters of person and property and rulers of the soil



Figure I.

they trod. We notice the characteristics of the short-cropped hair, the deep-cut folds above the nose, which is strong but sharply modeled; the energetic mouth, whose upper lip is covered with a moustache trimmed by scissors, and which, in expectation of his "portrait being taken," seems carefully waxed and trimmed at both ends.

We do not venture to state from what part of conquered Central America this image of one of the Castilian "bravoes" has found its way to Coban, where it was obtained by Mr Sarg. What we wish to emphasize is that this head cannot possibly be viewed as belonging to the indigenous race, and can hardly have been manufactured on the place or neighborhood where it was obtained. It may be remembered, in this connection, that by



Figure 11.

solemn contract made with the chieftains of the Verapaz, white men, save the few missionaries appointed by the bishop of Guatemala to convert the natives, were forbidden to visit this province. It is but thirty years since that the Indians of the Verapaz have permitted white men to settle among them.

As regards Figs. I and II we also think these clay relics must be considered as being imported to the Verapaz; there is no doubt, however, that they represent specimens of an

Indian race. This fact is plainly warranted at first sight by the peculiar cut of the hair, the pearl string around the neck, the scanty shirt, and the large ear-plates. That the latter are square and not round, as they are usually represented throughout Mexico and the whole of Central America, in sculpture as well as in painting, is a fact so exceptional that it must strike the eye of every student conversant with the matter.

The clay figure (I) shows a plump little woman sustaining the weight of a large water vessel on her shoulders. We imagine her having gone down to the brook to fill it, and that trying to lift the heavy vessel she found the task to be too hard for her. So she broke down, musing what to do with her own self and what with that vexatious burden. Her helplessness is marvelously well

expressed, and must have been caught in the act itself by the watchful eye of one of the tribal artists, who really executed a little masterpiece when he made her leer angrily toward the cruel foe that keeps her pressed to the ground, and at the same time contrasted her feeling of despair with that of self-ridicule, expressed in the laughter of the upturned lips. This highest apex of art—to depict in the position of the body, and in the facial lineaments any predominant or mixed feeling, such as would stir the muscles of the human face under the impulse of a certain momentary impression—is never seen in any product of Indian hand from Puget sound down to Patagonia. The only exception we know of is that of the Chiriquian potter-artist.

Through his work in this line, as shown in excavated specimens, we feel almost compelled to say that the Chiriquian Indian shows himself the only one of the many races of the whole continent who knew mirth and merriment, and who did not deem it beneath his dignity to reproduce these sentiments in his much-beloved clay. Now, we are far from venturing the conjecture that our little statuette was imported from the Isthmian straits to the Altos of Guatemala. What we conjecture is only this: that it was the product of



Figure III.

the hands and of the mirthful bent of mind of those Chiriquian invaders, of whom we read in Burgoa that they had come sailing in canoes from Nicaragua and farther south to land in Tehuantepec, taking possession of the islands and waging a long war against the Zapotecas, by whom they finally were absorbed. The same way, we know, had also come the Mangues, only that this tribe succeeded in taking permanent hold of Chiapas. Therefore it would not be preposterous to assume that some families of those straggling *Wabi*, as they were called by the Zapoteca, or *Cueva* and *Coiba*, as the Isthmian Conquistadores called them, had kept up their independence as well as their hereditary talent in the country of their adoption. The Chiriquians we know of wore no square ear-plates or any ear-dress at all, but, having settled among the gorgeous Zapoteca, they may have adopted the fashion, only that they chose or were forced, for the sake of

individuality, to shape them otherwise; also the straight forehead, the rounded fat face, and the full sensual lips (Fig. III) speak of a race distinct from that among which they had come to live.

We leave it to the expert to refute or confirm the conjectures we have hazarded concerning these clay figures from Coban.

OBITUARY**James Constantine Pilling**

The scholarly article on the writings of Padre Andres de Olmos on pages 43-60 of this volume was the last notable publication of James Constantine Pilling, bibliographer and administrative officer; he died July 26, 1895, of locomotor ataxia, from which he had been a constant sufferer for years.

Despite a painful and hopeless malady, Mr Pilling was an industrious, prolific, and erudite student of literature relating to the native American languages. During 1894 he put through the Government press a bibliography of the Wakashan languages; in 1893 he issued a bibliography of the Salishan languages and a bibliography of the Chinookan languages (including the Chinook jargon); during the next preceding year his bibliography of the Athapascan languages was prepared and issued; in 1891 he prepared and revised the most extended of his bibliographies, that relating to the Algonquian languages, a volume of 625 pages, illustrated by facsimiles of titles of rare works; in 1889 his bibliography of the Muskhogean languages was published, and during the preceding year that of the Iroquoian languages was made ready to leave the press; in 1887 the bibliographies of the Siouan and Eskimo languages were issued. These nine volumes are a rich store of knowledge pertaining to American ethnology; the work is primarily linguistic, yet the mode of treatment is such that practically all of the more valuable early literature of the American Indians is listed and described. The series represents the fruition of the plan for a bibliography of the languages of the North American Indians set forth in a quarto volume of nearly 1,200 pages by the same author, issued in the form of proof-sheets in 1885. This bibliographic work was projected by Major J. W. Powell,

and Mr Pilling was placed in charge of it on account of his learning, accuracy, and literary ability. No class of the scientific publications of the Government has been received with greater favor by scholars; wherever anthropology is cultivated throughout the world, there Pilling's bibliographies are known.

For several years Mr Pilling was chief clerk of the Bureau of American Ethnology, and also of the United States Geological Survey, and much of his bibliographic material was accumulated while he was engaged in the performance of the arduous duties attending these offices. His faculties were such that he was able to carry forward the literary work without prejudice to his administrative duties, which were performed with noteworthy ability and judgment; indeed, no inconsiderable part of the success of the two bureaus is to be ascribed to his skill, tact, and energy in administrative work.

In early manhood Mr Pilling came in contact with Major Powell, whom he accompanied into the field and by whom his bent of mind and subsequent career were measurably determined. His interest in Indians and in linguistics grew out of this association. He had already made himself a stenographer of exceptional skill, and had acquired literary knowledge through employment in a book store. His education, begun in the public schools of Washington, was perfected in Gonzaga College. He was born in Washington November 16, 1846.

In the world of letters James Constantine Pilling was and will be known as a bibliographer of notable acumen and erudition; in the Federal capital he was most widely known as an upright and courteous administrative officer. Among his more intimate acquaintances at home and abroad he is remembered as a man of exceptional integrity and amiability. Powell, who knew him long and intimately, says: "In all my life I have never known a man more steadfast to his moral and intellectual convictions, which were held with that charity for others which is possible only to those who have strong and well-founded convictions of their own." His official associates, joining in an expression of sorrow on receiving the intelligence of his death, said: "In recalling our associations with him we recollect no discourteous act or word, even when the burden of duty pressed most heavily; we recollect no selfish or narrow decision; on exchanging ideas

we all, without exception, agree that we have known no man of higher integrity or better motives. His administrative work was a model, and its results in the bureaus with which he was connected constitute a monument."

Mr Pilling left a consort, to whose tireless solicitude through years of painful decline the completion of so much of his work is due, and a young daughter.

W J MCGEE.



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